

Robert D. Legler Floyd V. Bennett

Mission Operations Johnson Space Center



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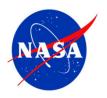
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MOD EMBLEM



MOD EMBLEM DESCRIPTION

This emblem was developed during the Apollo program for the mission control team [JSC Mission Operations Directorate, MOD] to recognize their unique contribution to manned space flight since the Mercury program.

The sigma (Σ) represents the total mission team, including flight controllers, instructors, flight design and production specialists, and facility development and support teams including all engineering, scientific, operations disciplines, and supporting tasks.

The Shuttle launch represents the dynamic elements of space, the initial escape from our environment, and the thrust to explore the universe. The four stars on the Shuttle's plume represent the basic principles of the Mission Operations team: discipline, morale, toughness, and competence. Their place along the Shuttle's plume reminds us that they are the foundation upon which each mission is flown. Today's core principles include confidence, responsibility, teamwork, and vigilance. Each of these words comes into the vocabulary of Mission Operations personnel at critical points in their development. These words can never be forgotten if we are to succeed in the future.

The orbiting International Space Station symbolizes a permanent human presence in space, conducting research and developing materials leading to the commercial utilization of the space environment.

The Earth is our home and will forever be serviced by both manned and unmanned spacecrafts in order to improve our quality of life. A single star is positioned over Houston, the home of U.S. human spaceflight operations.

The comet represents those individuals who have given their lives for space exploration. The seventeen stars represent our fallen astronauts, to whom in part we dedicate our commitment to excellence. These symbols serve as a reminder of the risks inherent to space flight and recognize that we of Mission Operations provide the margin that makes the risk acceptable.

The Mercury, Gemini, Apollo, Skylab, and Apollo-Soyuz Test are represented on the bottom border. At the top of the emblem, the Moon and Mars represent our future, signifying our intent to lead the way.

The wording "RES GESTA PER EXCELLENTIAM" - "Achieve through Excellence" - is the standard for our work. It represents an individual's commitment to a belief, to craftsmanship, and to perseverance, qualities required to continue the peaceful development of space and the quest for the stars.

The original emblem was designed (at the request of White Flight, Gene Kranz) by Robert T. McCall in April 1973 and bears the inscription "For the Personnel of Mission Control with Great Respect and Admiration. Robert T. McCall." Mr. McCall died at age 90, May 5, 2010. In 1983, the original emblem was updated to support the Space Shuttle program. In 2004, with the artistic help of graphic designer Mike Okuda and participation of the Mission Operations team, the emblem was updated to recognize the achievements and contributions of the team supporting the International Space Station program as well as those that contributed to the success of the earlier Skylab and Apollo-Soyuz Test Project missions.

ABSTRACT

This document was originally produced as an informal Mission Operations book and has been updated since Space Shuttle Flight STS-1 and throughout the program. This version is a formally released NASA document. It is a handy reference guide for flight data for all Space Shuttle missions. "As-flown" data is provided as compiled from many flight support sources for ascent, on-orbit events, and descent mission phases. In addition, the specific shuttle vehicle configuration, payload, flight crew, and flight directors are

identified for each flight. In the development of this book, the data for the early flights are contained on a single page per flight. For later flights, more pages per flight have been added, primarily for growth in mission complexity as noted in the "Mission Highlights" data column. This particularly applies to missions involved in the assembly of the International Space Station. Pertinent photos for each mission are also included on each mission summary page.

FOREWORD



ABOVE: S81-30498 --- After six years of silence, the thunder of U.S. manned spaceflight is heard again, as the successful launch of the first Space Shuttle reusable vehicle, Columbia, ushers in a new concept in utilization of space - April 12,1981.

RIGHT: Thirty years later on STS-135, the Atlantis vehicle executes the final Space Shuttle landing on July 21, 2011 at KSC. With the closure of the Space Shuttle Program, the thunder of U.S. manned spaceflight is not expected to be heard again for another several years.

THE REUSABLE SPACE SHUTTLE

The Space Shuttle Vehicle (SSV) was the world's first reusable Spacecraft. It consisted of a reusable Orbiter Vehicle with three Space Shuttle Main Engines (SSMEs), two Solid Rocket Boosters (SRBs), and an expendable External Tank (ET). The Space Shuttle System consisted of the SSV elements, Shuttle Carrier aircraft, payload accommodations, and ground support systems. The SSV was designed to perform a variety of missions to low Earth orbit with heavy payload lift capability.

SSV missions included: Manned payload bay laboratory science, deployment and servicing of payloads, and special support to space activities such as sortie missions (rescue, repair, maintenance servicing, assembly, and docking), and International Space Station (ISS) assembly, manning, and support including robotic and manned extra vehicular activities.

The SSV was flown for 30 years from 1981 to 2011. Brief mission summaries for each of these missions are provided in this document. The document contains "as flown" mission data and pertinent photographs for each flight. It was originally published as an informal document and routinely updated throughout the Shuttle era.



FOREWORD (Continued...)

----- SPACE SHUTTLE THOUGHTS-----

The Space Shuttle--1981 to 2011

The Space Transportation System-STS-has had a spectacular career spanning three decades of intense and productive activities in space. The Shuttle was conceived as a reusable launch system to grossly reduce the cost of transporting humans and satellites into low earth orbit and to service the entire spectrum of government and commercial space operations requirements. To accomplish this challenging task required the development of a series of new technologies in rocket engines, space systems, unique materials, highly advanced manufacturing techniques, autonomous control concepts and never before attempted flight operations maneuvers. The fact that these devices were conceived and developed and in almost all cases could be reused is a testimony to the marvelous capability of the US and allied aerospace community.

Equally significant was the ability of the government industry team to bring about

the successful development of this phenomenal machine under the stringent and ever changing and fickle government budgetary process. The management team was required to continuously adjust the expenditure of funds because of both postponement and reductions in national budget that resulted in a delay in manufacturing facilities, extended testing periods and technology development which presented extraordinary circumstances regarding the ability to arrive at the first flight of the Shuttle. And although the first and subsequent STS flights were delayed by several years, the cost to build the transportation system was reasonably close to the original cost estimates. Indeed, if the effects of inflation are included, the overall cost of the program was probably within the costs estimates made almost ten years previously.

There were two devastating fatal accidents during the course of the STS time period. It should be noted that both of these accidents took place because of mismanagement. The accidents literally destroyed the user confidence in the STS and resulted in the eventual termination of the Shuttle. The Space Shuttle without these two unnecessary failures is an extremely safe space faring vehicle and it will be a long time in the future before a reusable rocket caring humans will match this accomplishment.

An overall assessment of the STS must say that history will show the accomplishments were spectacular.

Christopher C. Kraft, Jr. First Flight Director



I look at the three decades of Space Shuttle flights with a great deal of pride. John Young and I had the privilege of flying Columbia on the initial orbital test flight. While the Shuttle didn't live up to some of the preflight hype regarding flight rate and cost, it still is the most fantastic spaceship ever built and likely will be for the foreseeable future. Yes, we had two terrible tragedies, but spaceflight is not without risk now and for the foreseeable future.

The Shuttle has accomplished many wondrous feats in its 30 years of flight. In the beginning it flew very important DOD missions that I believe played a major role in the winning of the Cold War. The payloads it has taken to orbit have revolutionized knowledge of our solar system and the universe. The Shuttle Program made possible the construction of the unbelievably complex International Space Station.



All in all, everyone associated with the Shuttle should be proud of what the program accomplished. It will be a very long time before we see a spaceship with anywhere near the Shuttle's capability.

Bob (Crip) Crippen
PLT STS-1, and CDR STS-7, STS-41C & STS-41g
KSC Center Director 1992 - 1995

Continued...

FOREWORD (Continued...)

----- SPACE SHUTTLE THOUGHTS-----

National Space Transportation System (Space Shuttle)

Developed primarily in the 1970's, the National Space Transportation System (Space Shuttle) was, and remains to this day, the most innovative and capable human rated space launch system created by man.

As much as Apollo, the Space Shuttle established the United States as the human space flight technology leader of the world, made human access to low-Earth orbit (LEO) relatively routine, and raised the expectations of the global population in regards to the value of space to mankind. It has enabled us to learn to live and work in space to create value on Earth.

The Shuttle designers both advanced the state of technology by levying seemingly unachievable technical challenges, such as the incredibly high power density Space Shuttle Main Engine (SSME), complex redundant data processing, and reusable thermal

protection systems, as well as utilizing available technology like aluminum structure and hydraulic flight control and thrust vector control systems.



The Shuttle designers both advanced the state of technology by levying seemingly unachievable technical challenges, such as the incredibly high power density Space Shuttle Main Engine (SSME), complex redundant data processing, and reusable thermal protection systems, as well as utilizing available technology like aluminum structure and hydraulic flight control and thrust vector control systems.

By advancing the state of the art in mission planning and execution, the Shuttle team took maximum advantage of the extensive capabilities available from both man and machine and the synergistic interplay between them. The results in mission accomplishments are undeniable and have forever transformed our understanding of the world in which we live.

Brewster H. Shaw, Jr.
PLT STS-9 and CDR STS-61B & STS-28
Space Shuttle Program Mgr 1993 -1995
VP & GM Space Exploration Boeing Houston

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ACRONYM LIST

| AIM PT AL AOA AR ASC ASC/ENT AVE BRK DECEL | AIM POINT ASCENDING LEFT ABORT ONCE AROUND ASCENDING RIGHT ASCENT ASCENT ASCENT/ENTRY AVERAGE BRAKE DECELERATION | MPS MRN M/S MTR N NEG RET NLGTD | MAIN PROPULSION SYSTEM MORON MISSION SPECIALIST MOTOR NOMINAL NEGATIVE RETURN NOSE LANDING GEAR TOUCHDOWN |
|---|--|--|--|
| BEN BR/UP BYD | BEN GUERIRBRK INIT BRAKE INITIATION VELOCITY IN KGS BREAK UP ALTITUDE OF ET IN THOUSANDS OF FEET BANJUL | O1, O2, O3 OFT OI OMS OPF ORB DIR | ORBIT 1, 2, OR 3 FLIGHT DIRECTOR SHIFTS OFFICIAL FLIGHT DESIGNATOR OPERATIONAL INCREMENT ORBITAL MANEUVERING SYSTEM ORBITER PROCESSING FACILITY ORBIT DIRECTION |
| CI CTOB DENS ALT DL DOLILU DR EDW EMU ET EVA | CLOSEIN CREW TIME ON BACK DENSITY ALTITUDE DESCENDING LEFT DAY OF LAUNCH I-LOAD UPDATE DESCENDING RIGHT EDWARDS AFB ENVIRONMENTAL MOBILITY UNIT EXTERNAL TANK EXTRA VEHICULAR ACTIVITY SS FEMALE NUMBER | P PAO PERF PERF MARGINS P/L PLNG PLS P/S PTA PTM R RECON RMS RPT RSRM | SEQUENTIAL NUMBER OF PERSON FLOWN ON SS PUBLIC AFFAIRS OFFICE PERFORMANCE PERFORMANCE MARGINS PAYLOAD PLANNING SHIFT PLANNED LANDING SITE PAYLOAD SPECIALIST PRESS TO ABORT ONCE AROUND PRESS TO MECO SS ROOKIE NUMBER RECONSTRUCTED REMOTE MANIPULATOR SYSTEM RUPTURE OF ET IN THOUSANDS OF FEET REDESIGNED SOLID ROCKET MOTOR |
| FD FDRD FPR FRD GMTLO HA/HP HDOT KEAS KGS | FLIGHT DIRECTOR FLIGHT DEFINITION & REQUIREMENTS DOCUMENT FLIGHT PLANNING RESERVE FLIGHT REQUIREMENTS DOCUMENT GREENWICH MEAN TIME OF LIFTOFF APOGEE AND PERIGEE IN NAUTICAL MILES TOUCHDOWN ALTITUDE RATE KNOTS EQUIVALENT AIRSPEED KNOTS GROUND SPEED | RTLS SEQ SLS SODB SS SSME S/T TAL TD NORM 195 TDDP TDEL | RETURN TO LAUNCH SITE SEQUENTIAL SECONDARY LANDING SITE SHUTTLE OPERATIONAL DATA BOOK SPACE SHUTTLE OR SUN SHIELD SPACE SHUTTLE MAIN ENGINE SHUTTLE TOTAL FLIGHT TIME TRANSOCEANIC ABORT LANDING NORMALIZED TOUCHDOWN RANGE AT 195 KEAS TRAJECTORY DESIGN DATA PACKAGE DIFFERENCE IIN REFERENCE TIME |
| KSC W/D LD/O1 LDA | KSC WORKDAY LEAD/ORBIT 1 SHIFT LAUNCH DANGER AREA | TK T/V | FOR SSME THROTTLE ADJUSTMENT TANK TUMBLE VALVE |
| M M 3 EOM MECO MET MLGTD MLP MMT MMU MOD | SS MALE NUMBER MACH 3 END OF MISSION MAIN ENGINE CUT OFF MISSION ELAPSED TIME MAIN LANDING GEAR TOUCHDOWN MOBILE LAUNCH PLATFORM MISSION MANAGEMENT TEAM MANNED MANEUVERING UNIT/ MISSION OPERATIONS DIRECTOR MISSION OPERATIONS DIRECTORATE | V VAB VEL VI W/D WX X CG XRANGE ZZA | SS VETERAN NUMBER VEHICLE ASSEMBLY BUILDING VELOCITY INERTIAL VELOCITY WORKDAY WEATHER X CENTER OF GRAVITY CROSSRANGE ZARAGOZA (TAL SITE) |

ABOUT THIS DOCUMENT

CONVERSION FROM INFORMAL DOCUMENT

Robert D. "Bob" Legler/DA8/USA was the originator of this book as an informal Mission Operations Document to provide a "handy reference guide" for "as flown" mission data, often used by JSC Flight Controllers and Mission Planners.

Mr. Legler authored the informal book from flight STS-1 through flight STS-115. After Legler's death in 2007, Floyd V. Bennett/DA8/USA/GHG took over the authorship for STS-116 and all missions to follow. In addition, a "Brief Mission Summary" statement for all ISS assembly missions and pertinent mission related photos to each summary file were incorporated.

This formal NASA document is a conversion of the informal version to provide an official historical record of pertinent Space Shuttle Missions Operational Data.

DOCUMENT FORMAT

The "as flown" operational mission data is presented in a summary table format of twelve columns. For early flights the book contains one page of data per flight. For later flights, as on-orbit activities became more and more complex, additional pages per flight were added, primarily for growth in the 12th column, "Mission Highlights".

In addition a summary table of weight data for each shuttle element and payloads for each mission is provided in Appendix A.

In Appendix B the authors acknowledge individuals for contributions to the preparation of this document and provides the data sources and Points of Contact (POCs) used in compiling flight and weight data.

Appendix C provides an historical record of JSC Flight Controllers originally compiled by Bob Legler, "History Flight". Since his death the listing has been maintained by the JSC Flight Directors Office.

And lastly, information about the authors is provided in the back of the book including an "In Memoriam" for Bob Legler.

MISSION SUMMARIES DATA DEFINITIONS

This section contains definitions of the data provided in the Mission Summaries by column number. Several entries have been assigned sequential numbers for reference purposes (e.g., # of rendezvous, # of night launches, # EVAs, etc.).

Column 1:

<u>FLIGHT NUMBERS</u> - The flight numbers include the official STS flight designator, followed by: the original flight designator (as applicable), the sequential flight number, the KSC launch sequential number, the OFT flight number (as applicable), the ISS flight number (as applicable), the launch pad sequential number, and MLP used.

Column 2:

<u>ORBITER</u> - Provides Orbiter designation, number of flights flown, & OMS PODs #'s.

Column 3:

<u>FLIGHT CREW</u> - Flight Crew members & titles are listed for each flight. Space shuttle flight (SS) number designators are listed for each crew member as follows:

P = sequential number of person flown on SS; R = SS rookie number; V = SS veteran number (second flight on SS); M = SS male number; F = SS female number. No attempt is made to determine which seat arrives first in orbit on the same flight. Example: P17/R2/V1/M2 - person 17, rookie 2, veteran 1, male 2. Once assigned a number, the crew member retains those R, V, & M or F numbers. Only the P number would change on subsequent flights.

<u>EVAs</u> - Relates to SS EVAs. Includes type of EVA, dates/times of EVAs, EVA crew member names, and sequential number of SS EVAs and EVA times.

<u>FLIGHT DIRECTORS</u> - The Flight Directors and Mission Operations Director are listed for each flight.

 $\underline{\text{CAPCOMS}}$ - CAPCOMS are listed for missions STS-116 and all to follow.

ABOUT THIS DOCUMENT

Column 4:

<u>LAUNCH/LIFTOFF/ASCENT DATA</u> - Includes Pad Number, Liftoff Times [planned (P) and actual (A) in Eastern Time Zone and Greenwich Mean Time (GMT) liftoff time], Date of Launch followed by a number indicating how many SS flights have been launched on that month to date, Day-of-Week Launch followed by a number indicating how many SS flights were launched on the day of the week, Window Duration and Closure Rationale, Planned Landing Sites including those selected on Day of Launch, Ascent Events, and Abort Calls. In the later flights, there are two sets of data in the Ascent Events Column. The left set is planned METs and Velocities, and the right set is the actual METs and Velocities for the specified events.

Column 5:

LANDING DATA - Includes Landing Site/Runway followed by a Sequential Number indicating the Number of Concrete/Lakebed landings at EDW or a Sequential Number for Landings at NOR and KSC. Landing time is in local time for the landing site. The Landing Day of Week is followed by a Number indicating how many landings have been made on that day of the week. The Number after the Landing Date is the Sequential Number of Landings during that month, i.e., 4/2/92 (7), STS-45 is the seventh landing in April. Each Orbit Direction for Landing is followed by a Sequential Number. The Winds are designated in knots of head, tail and left and right crosswinds. The first listing was obtained from the MOD Descent Postflight Summary and is basically the Winds observed on a display at the touchdown time. The second listing is the "Official" Winds, which are the Two Minute Average Winds spanning the MLG Touchdown Time. The Flight Durations are determined from the time of liftoff to MLG Touchdown, specified in days, hours, minutes, and seconds.

 $\underline{\text{S/T}}$ - Shuttle Total Flight Time, i.e., Accumulated Total. This is followed by an Orbiter Designator and the Accumulated Flight Time for that Orbiter.

Column 6:

<u>SSME DATA</u> - Includes Nominal, Abort, and Emergency Throttles, Predicted and Actual Throttle Profile, and Engine Serial Numbers followed by the Number of Flights on that engine. For a lack of space elsewhere, the Mach 3 End-of-Mission Weights and X CG and Landing Weight and X CG have been added in this column.

Column 7:

<u>SRB/SRM/RSRM</u> - Includes the "Build Item" Number followed by SRM/RSRM Type or Number.

ET DATA - Includes ET Numbers, ET Rupture and Breakup Altitudes and Times in MET, and Tumble Valve Use. These times and altitudes were not available for flights after STS-46. However, the time, latitude, and longitude of ET Impact are included for all missions.

Column 8:

ORBIT INCLINATION - This is the Inclination after OMS-2 and is followed by a Sequential Number indicating how many flights were flown at that inclination. Inclinations between 28.45 and 28.55 have been considered the same for the purposes of assigning Sequential Numbers.

Column 9:

<u>ORBIT HA/HP</u> - Insertions were Standard Insertions unless specifically stating "Direct Insertion". Generally, Altitudes for Post OMS-2 are given, as well as Payload Deploy Altitudes and De-orbit Altitude.

Column 10:

<u>FLIGHT SOFTWARE DESIGNATORS</u> - OI (Operational Increment) numbers are followed by a Sequential Flight Number for that OI.

ABOUT THIS DOCUMENT

Column 11:

PAYLOAD DATA - Includes Cargo, Chargeable, Deployed, Non-Deployed, and Middeck Weights as documented in the SODB for flights STS-1 through STS-57. Effective with STS-51, the SODB data is no longer updated as flown. Therefore, the data has been obtained from the Day-of-Launch (DOL) Trajectory Design Data Package (TDDP). The following Shuttle Accumulated Weights are provided: (1) Total Payload Deployed Weights left in orbit, (2) Total Non-Deployed Payload Weights (does not include Ancillary Equipment such as ASE, cabling, etc.), and (3) Total Cargo Weights which include all Ancillary Equipment. Weights for seven DOD flights are not included. Performance Margins: Four numbers are provided - (1) Flight Planning Reserve (FPR); (2) Fuel Bias; (3) Final TDDP is margin above FPR, and Fuel Bias using mean wind and atmosphere for launch month, no unplanned drainback and final selected I-load; and (4) Recon is margin above MET wind and atmosphere, any unplanned drainback, final estimated MPS loads (a.k.a., "Reconstructed" Systems Performance). It should be noted that STS-27 Delta Margin was -295 lbs for drainback, -365 lbs for wind/atmosphere. STS-31 Delta Margin was -753 lbs for drainback, +461 lbs for wind/atmosphere. STS-41 was -358 lbs for drainback, -488 lbs for wind/atmosphere. Payloads are identified as being Primary, Payload Bay (PLB), and/or Middeck Payloads. Payload Column also contains the number of cryo Tank sets and whether a RMS was flown followed by a Sequential Number and serial number of the RMS.

Column 12:

MISSION HIGHLIGHTS/MISCELLANEOUS DATA COLUMN -Includes the Number of KSC Workdays in OPF, at VAB, at Pad, and Total Workdays. Launch Postponements may not contain early postponements. Postponements are defined as launch delays which occurred prior to call-to-stations for OMI S0007 Shuttle Countdown. Scrubs are launch date changes after the start of Shuttle countdown (countdown was terminated or recycled to a later launch date). Launch Delays are delays which occur only on the day-of-launch. Other data included are TAL Weather Data, Night Launch and Night Landing Sequential Numbers, Flight Duration Changes, Landing Site Changes, Firsts, Events, and Significant Anomalies as judged by the compiler (not all Anomalies are included). Use of Alternate and DOLILU I-loads are included with a Sequential Number for Uplinks. STS-27 was the first flight with the capability to uplink Alternate Iloads for use and STS-48 was the first flight with DOLILU capability. Rendezvous operations are identified including the Target and Sequential Number of each Space Shuttle Rendezvous. Also, a Brief Mission Summary has been added for the first ISS Assembly Mission, STS-88/2A, and all missions to follow.

2. SPACE SHUTTLE MISSIONS SUMMARY SECTION

Page 2-0

| | 31 / (32 3113 1 122 mid3131 13 3 3 mim 11 1 | | | | | | | | | | | | |
|---|--|---|---|--|--|-----------------------------------|---|---|--------|--|--|--|--|
| FLT | ORBITER | CREW (2) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, | | |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) | | |
| STS-1 SEQ FLT #1 KSC 1 OFT-1 PAD | OV-102 Flight 1 Columbia OMS PODS LVO1 - 1 RVO1 - 1 | CDR: John W. Young P1/R1/M1 PLT: Robert L. Crippen | KSC 39A 102:12:00:03.9Z 7:00:00 AM EST (P) 7:00:04 AM EST (A) Sunday 1 4/12/81 (1) | EDW 23, LKBD (EDW 1, LKBD 1) 10:20:57 AM PST Tuesday 1 4/14/81 (1) | 00/100 (100) 65% 1 = 2007 (1) | A7/8 86-80E MTR: STD | 40.3° (1) <u>START:</u> -25.6° | STANDARD INSERTION INSERTION ALTITUDE: 145 NM | R16/T9 | CARGO: 10823 lbs DFI: 9290 lbs | KSC W/D: OPF 531, VAB 33, PAD 104 =668 LAUNCH POSTPONEMENTS: Yes. LAUNCH SCRUBS: - Scrubbed 4/10/81 launch at T-18 minutes because BFS | | |
| 39A-1 | FRC2 - 1 | P2/R2/M2 MCC FCR-1 (1) | WINDOW DURATION: 4.7 hours | <u>XRANGE</u> : 315 NM <u>ORB DIR</u> : DR (1) | 2 = 2006 (1) 3 = 2005 (1) | <u>CASE</u> : STD 168-80 | <u>END</u> : -19.9° MAX: | 152/152 172/172 SM | | SHUTTLE ACCUMULATED WEIGHTS: | did not track PASS timing. Rescheduled launch for 4/12/81. 2-day slip Installed S/W patch to correct problem. | | |
| J. J | | FLIGHT DIRECTORS: A/PLG - N. B. Hutchinson ORBIT - C. R. Lewis ENT/ORB - D. R. Puddy | PLS - EDW SLS - NOR NO TAL AOA - EDW | <u>AIM PT</u> : NOMINAL <u>MLGTD</u> : 6053 FT 104:18:20:57Z | | SWT ET-1 | | | | DEPLOYED: 0 lbs NON-DEPLOYED: | LAUNCH DELAYS: 4 seconds. CONTINGENCY LANDING SITE (CLS) WX: - Rota was go. There was no TAL site for STS-1. | | |
| le le | Columbia VNG CRIPPEN | MOD - E. F. Kranz | NOR CLS - HICKAM KADENA | VEL: 190 KGS 183 KEAS HDOT: -1.5 FPS | - | | | | | 10823 lbs CARGO TOTAL: | FLIGHT DURATION CHANGES: None. | | |
| | | | ROTA MAX Q = 617 M = 1.06 | TD NORM 195: 4973 FT NLGTD: 9152 FT 104:18:21:07Z | | | | e e | F E | 10823 lbs PERFORMANCE MARGINS NOT AVAILABLE | FIRSTS: - First orbital flight of reusable Space Shuttle vehicle First manned vehicle space flgiht w/o unmanned test flight. | | |
| | | | <u>SRB SEP</u> : 2:11.7 MET <u>MECO</u> : | VEL: 156 KGS HDOT: -5.6 FPS BRK INIT:105 KGS | X Z | | | S. A. | | PAYLOADS: IECM/REM DFI | SIGNIFICANT ANOMALIES: - SRB ignition overpressure (higher than expected) deformed FRCS oxidizer tank aft Z strut OMS POD tile LRSI tiles lost. | | |
| V | | | 8:34 MET <u>ET SEP</u> : 8:52.1 MET | AVE BRK DECEL: 5.9 FPS/S WHEELS STOP: | V | | 12, 198 ⁻ | 1 | | NO RMS 2 CRYO TANK | - WMS problems (degraded air suction). - ET tumble system did not work. - PLBD closure overlap more than expected. - Cabin temperature controller did not maintain selected | | |
| | | Orbit g in the cockpit n prepares dinner on | <u>OMS-1</u> : 10:34 MET 86.1 Seconds | 104:18:21:36Z 15046 FT ROLLOUT: | | (S81 | -30500) | | | SETS | temperature. - OMS quantity gaging system was sticking during flight. - Both Radar Altimeters lost lock at 75 feet (no valid data after 75 feet). | | |
| | | | OMS-2: 44:02 MET 74.8 Seconds | 8993 FT 60 SEC <u>WIND</u> : | M 3 EOM WEIGHT: 195943 | <u>ET</u> <u>BR/UP</u> 223K | | A | | • | Difficulty locking doors on two storage lockers due to misalignment. CONTINGENCY LANDING SITE: | | |
| | | | DEORBIT 148 X | 2T, 2R KNOTS OFFICIAL: 1H, 1R DENS ALT: 2200 FT | X CG: 1096.7 | 47:42 MET | 4 | United States | | * | - ROTA was a contingency landing site but not required for one SSME out. | | |

...In the MCC... Gene Kranz/FOD, Chris Kraft/JSC Ctr Dir. & Max Faget/E&D (Father of U.S. Manned Spacecraft Design)

146 NM

VELOCITY 25731 FPS

RANGE 4379 NM

<u>ET</u> <u>IMPACT</u> LANDING

LAT:

30.95°S

LONG:

WEIGHT: 195473

FLT DURATION:

2:06:20:53

<u>DISTANCE</u>: 933,757 sm

54:20:53

93.2°E X CG: 1098.1



... and Touchdown at EAFB! -- April 14, 1981 --

"That's the world's greatest flying machine" - CDR John Young! (S81-30746)

S-BAND TRACKING SITES:

- MIL, PDL, BDA, MAD, IOS, ORR, BUC, GDS, HAW, ACN, GWM, QUI, AGO, TUL (NOR), PTT, VDT.

RADIATORS DEPLOY #1

NOTE: ON STS-1 AND STS-2, THE NOMINAL OGS AIM POINT WAS 6500 FEET (5500 FEET WAS THE CLOSE-IN AIM POINT).

| SPACE SHUTTLE MISSIONS SUMMARY | | | | | | | | | | | | |
|--------------------------------|---------------------|--|-----------------------|--------------------------------|--|---------------|---------------|-----------------------|-----------------|-----------------------------|---|--|
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | | |
| | | (2) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS | |
| FLT | ORBITER | (2) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, | |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, | |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) | |
| 070.0 | 01/100 | ODD | KSC 39A | WINDS EDW 23, LAKEBED | ENG. S.N. | A O /1 O | 20.00 | CTANDADD | D10/T11 | CARGO: | VCC W/D ODE 00 VAD 10 DAD 70 107 | |
| STS-2 | OV-102 Flight 2 | CDR: Joe H. Engle | 316:15:09:59.8Z | (EDW 2, LKBD 2) | 100/100 (107) | A9/10 | 38.0° | STANDARD INSERTION | KI8/III | <u>CARGO</u> : 18778 lbs | KSC W/D: OPF 99, VAB 18, PAD 70 = 187 | |
| 050 | Columbia | P3/R3/M3 | 7.20.00 AM ECT (D) | 1:23:12 PM PST | (107) | MTR: STD | (1) 63.25° | INSERTION | | 10//0105 | LAUNCH POSTPONEMENT: | |
| SEQ | Columbia | F3/N3/IVI3 | 10:10:00 AM EST (A) | Saturday 1 11/14/81 (1) | 68% | WIK. SID | 03.23 | INSERTION | | CHARGEABLE: | - 45-day postponement caused by FRCS N204 spill on | |
| FLT # 2 | | PLT: | Thursday 1 | 11/14/81 (1) | 0070 | CASE: | START: | ALTITUDE: | | CHAROLABLE. | tiles resulting in debonding of tiles. | |
| KSC 2 | | Richard H. Truly | 11/12/81 (1) | XRANGE: 63 NM | 1 = 2007 (2) | STD. | -53.5° | 137 NM | | | thes resulting in deponding of thes. | |
| OFT-2 | OMS PODS | P4/R4/M4 | | | 2 = 2006 (2) | 168-80 | | | | SHUTTLE_ | LAUNCH SCRUB: | |
| 0112 | LVO1 - 2 | | <u>WINDOW</u> | ORB DIR: DR (2) | 3 = 2005 (2) | | END: | 120/120 | | <u>ACCUMULATED</u> | - Scrubbed 11/4/81 launch at T-31 seconds because | |
| PAD | RVO1 - 2 | MCC FCR-1 (2) | DURATION: | AIM PT: NOMINAL | | SWT | -56.2° | 137/137 NM | | WEIGHTS: | APU's 1 & 3 lube oil outlet pressure high at 100 to 112 | |
| 39A-2 | FRC2 - 2 | | 4.7 hours | AIWIT I. NOWINAL | | ET-2 | | | | DEPLOYED: | PSIA. Flushed APU's 1 and 3 gear boxes and changed | |
| | | | | MLGTD: 780 FT | | | | | | 0 lbs | clogged filters. Rescheduled launch for 11/12/81. | |
| 1 | | | PLS - EDW | 318:21:23:12Z | Burney Service | | | | The same | NON-DEPLOYED: | 53 days total slip. | |
| Col | umbia † | FLIGHT DIRECTORS: | SLS - NOR | VEL: 186 KGS 197 KEAS | | - | | | CONTRACT | 29601 lbs | LAUNCH DELAYC | |
| / | UIII Usa | ASC - N. B. Hutchinson | TAL - ROTA | HDOT: -1.0 FPS | | | | 1 1 | | CARGO TOTAL: 29601 lbs | LAUNCH DELAYS: - 2H40M delay MDM OF3 failure. Flew in replacement | |
| 4 | | PLNG - T. W. Holloway ORBIT - C. R. Lewis | (Selected) | | | 0 | | | | 29001 105 | MDM which also failed. Replaced with OV-099 MDM. | |
| ENGL | E-TRULE | ENT - D. R. Puddy | MAX Q = 640 | TD NORM 195: | | 0 | -4 | | | PERFORMANCE | - 10-minute delay for KSC confidence review of systems | |
| | | ORB - H. M. Draughon | M = 1.09 | 960 FT | | 10 | - | | AND C | MARGINS (LBS): | status. | |
| | | MOD - E. F. Kranz | 1.07 | NLGTD: 4429 FT | | | | | | FPR: 7057 | - Total launch delay: 2H50M | |
| | | | SRB SEP: | 318:21:23:26Z | The same of the sa | = 1700 | | - | | FUEL BIAS: 1050 | , | |
| | | 2 launch from KSC Pad | 2:10 MET | VEL: 137 KGS HDOT: -5.1 FPS | | MA | 7 | | - | FINAL TDDP: 2049 | TAL WX: Rota go. | |
| 39A (S | 81-39840) | | | 110013.1115 | | W. Chi | | 'IE | | RECON: 275 | | |
| | THE PERSON NAMED IN | Control of the Control | MECO: | BRK INIT: 109 KGS | 1 | | The 20 | (D) | 4 | | FLIGHT DURATION CHANGE: | |
| 1000 | a land of the land | 1 | 8:33.8 MET | AVE DDV DEGEL | The state of the s | | | | 160 | PAYLOADS: | - Shortened flight from 5D4H to 2D6H (priority flight after | |
| | | 1 200 | ET CED | AVE BRK DECEL: 6.1 FPS/S | | 148 | 1251 | 2 6 | | IECM/REM | Fuel Cell 1 failed at 0/04:45 MET). | |
| | | 1 | ET SEP: 8:57:2 MET | | CDR End | ale (left) 8 | PLT | Truly back a | t | OSTA-1/PALLET MAPS | FIDCTC. | |
| | | <i>F</i> | 0.37.2 IVIL I | WHEELS STOP: 318:21:24:03Z | EAFB aft | | | | - | SMIRR | FIRSTS: - First flight of RMS. | |
| | / | | OMS-1: | 318:21:24:03Z 8491 FT | | 0. 00.00. | (00.0 | , | | SIR-A | - 1 ii st night of Kivis. | |
| 350 | and my are | A | 10:33.9 MET | 047111 | | | | | | FILE | SIGNIFICANT ANOMALIES: | |
| | to to | 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 77 Seconds | ROLLOUT: | | | | | | OCE | - Fuel Cell 1 failure at 0/04:45 MET resulting in priority | |
| | 3-13 | The second second | | 7711 FT | | | | | | DFI | mission. Shortened flight from planned 5D4H to 2D6H. | |
| - | | | OMS-2: | 50 SEC | M 3 EOM | ET RPT | | | | | - Icing in WSB 3 inhibited lube oil cooling, resulting in | |
| | | | 41:41.7 MET | WIND: | | 256K | | | | RMS 1 (S.N. 201) | elevated APU gearbox outlet temp. | |
| | | | 69.2 Seconds | 20H, 3R KNOTS | WEIGHT: | 49:20 MET | | | | RMS CHECKOUT | - Excessive gas in drinking water. | |
| | 160 | | | OFFICIAL: 17H, 6L | 204356 | | | | | (UNLOADED OPS) | - TV camera B RMS elbow camera, PLB cameras A,B,C | |
| | 0 | | | DENS ALT: 3500 FT | V 00 | ET BB/UB | | DEODDIT | | 2 ODVO TANK | lenses had contamination. | |
| The same of | | | | <u>DENSTIEL</u> : 330011 | X CG: 1096.6 | BR/UP 219K | | DEORBIT 140 X | | 2 CRYO TANK SETS | - CRT 1 failed due to HV power supply problem RH SRB lost one main chute. | |
| Part Carlot | | | | FLT DURATION: | 1090.0 | 50:28 MET | | 139 NM | | SLIS | - RH SRM aft field joint gas leak to primary O-ring with | |
| | | | | 2:06:13:12 54:13:12 | LANDING | 30.20 IVIL I | | 137 14101 | | | erosion. | |
| 0 | | 100 | | J4.1J.1Z | | <u>ET</u> | | <u>VELOCITY</u> | | | - LH fwd windows degraded by salt spray. | |
| 100 | 3 1. | | | <u>S/T</u> : 4:12:34:05 | WEIGHT: | IMPACT | | 25726 FPS | | | | |
| - 2 23 | 1777 | | | 01/102 | 204263 | LAT: | | | | | RADIATORS DEPLOYED #2 (port stowed last 1/2 of | |
| | | ent Ronald Reagan is brie | efed by Dr. | OV-102: 4:12:34:05 | | 31.67°S | | <u>RANGE</u> | | | flight) | |
| | | , Jr., JSC Director, pointing | ig to MOCR | | X CG: 1098.1 | LONG: | | 4474 NM | | | NOTE ON STOA AND STOR THE NOMBLY SOS | |
| | | ent said, "Dr. Kraft, I was | | DISTANCE: | | 95.7°E | | | | | NOTE: ON STS-1 AND STS-2, THE NOMINAL OGS | |
| I don't | understand a | II this." Then he talked to | crew on orbit. | 933,757 sm | | | | | | | AIM POINT WAS 6500 FEET (5500 FEET WAS THE CLOSE-IN AIM POINT). | |
| | | | | | | | | | | | OLOGE-IN AIIVIT OIIVIT). | |

| | | | RY | Page 2-3 - STS-3 | | | | | | | |
|--|---------------|-------------------------------------|--|--|---|---|--|--|------------------------|---|---|
| FLT | ORBITER | CREW (2) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | (| ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| NO. STS-3 SEQ FLT # 3 KSC 3 OFT-3 PAD 39A-3 | RVO1 - 3 | | ABORT TIMES KSC 39A 81:15:59:59.875Z 10:00:00 AM EST (P) 11:00:00 AM EST (A) Monday 1 3/22/82 (1) WINDOW DURATION: 6.1 hours PLS - EDW SLS - NOR TAL - ROTA (Selected) MAX Q = 651 M = 1.04 SRB SEP: 2:07.9 MET MECO: 8:33 MET ET SEP: | FLT DURATION, | PROFILE ENG. S.N. 100/100 (107) 68% 1 = 2007 (3) 2 = 2006 (3) 3 = 2005 (3) M 3 EOM WEIGHT: 207349 X CG: 1095.4 LANDING WEIGHT: 207073 | A11/12 MTR: STD CASE: STD 86-80E SWT ET-3 ET RPT 235K 49:18 MET ET BR/UP 210K 49:58 MET ET IMPACT LAT: 31.2°S LONG: 94.4°E | 38.0° (2) 64.14° <u>START</u> : -33.2° <u>END</u> : -26.0° <u>MAX</u> : -36.0° | HA/HP STANDARD INSERTION INSERTION ALTITUDE: 130 NM 130/130 NM DEORBIT 130 X 120 NM VELOCITY 25659 FPS RANGE 4144 NM 8746 : Firs with ET wh deleted for ght saving: RE ET PAIN | et ite 800 s. | CARGO: 22710 lbs CHARGEABLE: RETURNED: 24492.8 lbs SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 0 lbs NON-DEPLOYED: 52311 lbs CARGO TOTAL: 52311 lbs PERFORMANCE MARGINS (LBS): FPR: 7444 FUEL BIAS: 1050 FINAL TDDP: 5343 RECON: 2278 | |
| ABOVE | E: s03-22-123 | IN Gly /Mg Ch Ctr per & /Mg /Mg Pro | 8:51:5 MET OMS-1: 10:34.4 MET 85.2 Seconds OMS-2: 40:50.4 MET 88 Seconds GR'S AT WORK MCC Lt to Rt: Inn Lunney or P/L Integ, ris Kraft /JSC Director, a son unknown, Aaron Cohen or Orbiter or Orbiter or Orbiter or Orbiter or orbites or orbites or orbites orb | WHEELS STOP: 89:16:06.09Z 14824 FT ROLLOUT: 13737 FT 84 SEC WINDS: 14H, 2L KNOTS OFFICIAL: 13H, 1L DENS ALT: 3700 FT | FLT DURATION: 8:00:04:45 192:04:45 12:12:38:50 OV-102: 12:12:38:50 DISTANCE: 3,900,000 sm | | | | | PAYLOADS: IECM/REM EEVT HBT-HEFLEX OSS-1 PDP/REM (PLASMA DIAGNOSTIC PACKAGE) DFI RMS 2 (S.N. 201) LOADED TESTS USING PDP WAVE PDP OUTSIDE P/L BAY 3 CRYO TANK SETS | - RMS wrist TV camera failed causing IECM OPS to be canceled. - AFT bulkhead latch did not fully latch (top sun for 15 minutes and latches operated normally). - WMS (slinger stopped on day 5). - Missing tiles on FWD upper fuselage and upper body flap. - CCTV camera C failed, camera B zoom failed. - ARPCS GN2 usage excessive (cold soak induced leak). - S-Band xponder 1 failed in hi and low power modes (downlink). - S-Band xponder 2 failed in low power mode (downlink). (Contaminants in RF control relay.) - S-band Power Amp reduced power output. - VTR tape broke. - Ammonia boiler controllers A&B failed. - Cracked rotor RH outboard MLG brake. - WSMR dust storm caused significant maintenance and cleanup of orbiter (gypsum contamination). - One RH SRB main chute failure 3 seconds after deployment. |

| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
|----------|-------------|----------------------------|---------------------|---|--|---------------|--------------------|--------------------|----------|------------------------------|--|
| | | (2) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (2) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE MANGE | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | TITLE, NAMES | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | & EVA'S | 7150111 1111120 | WINDS | ENG. S.N. | | | | | EAR EARINEMAN | 1 1110 10 10 10 1111 10 1111 1111 1111 1111 1111 1111 |
| STS-4 | OV-102 | CDR: | KSC 39A | EDW 22, CONC | 100/100 | A13/14 | 28.529° | STANDARD | R18/T11 | CARGO: | KSC W/D: OPF 41, VAB 7, PAD 29=77 |
| 313-4 | | Thomas K. Mattingly | 178:14:59:59.8Z | (EDW 3, CONC 1) | (107) | A13/14 | | INSERTION | K 10/111 | 24492 lbs | <u>K3C W/D</u> . OFF 41, VAB 1, FAD 29=11 |
| | Flight 4 | | | (2211 0, 00110 1) | (107) | MITD OTD | (1) | INSERTION | | 21172 100 | LAUNOU DOCTDONEMENTO, N |
| JLQ | Columbia | P7/R7/M7 | 11:00:00 AM EDT (P) | 9:09:40 AM PDT | 1001151 | MTR: STD | | oebelon | | PAYLOAD | LAUNCH POSTPONEMENTS: None. |
| FLT # 4 | | | 11:00:00 AM EDT(A) | Sunday 1 | 100/65/ | | START: | <u>INSERTION</u> | | CHARGEABLE: | |
| | | PLT: | Sunday 2 | 7/4/82 (1) | 100/65 | CASE: STD | -1.2° | <u>ALTITUDE</u> : | | 11644 lbs | LAUNCH SCRUBS: None. |
| KSC 4 | | Henry W. Hartsfield | 6/27/82 (1) | | | 86-80E | | | | | |
| | | P8/R8/M8 | | XRANGE: 581 NM | 1 = 2007 (4) | | END: | POST OMS-2 | | PRIMARY P/L: 9800 lbs | LAUNCH DELAYS: None. |
| OFT-4 | OMS PODS | | WINDOW DURATION: | | 2 = 2006 (4) | SWT | +20.5° | 139.2 X 131.05 | | 9800 lbs | |
| 0114 | LVO1 - 4 | MCC FCR-1 (4) | 4.4 hours | ORB DIR: DL (1) | | ET-4 | | NM | | ANIOULI ADV | TAL WX: Dakar no go - crosswinds. |
| PAD | RVO1 - 4 | | | AIM DT. NOM | , | | | | | ANCILLARY: 1844 lbs | |
| | FRC2 - 4 | FLIGHT DIRECTORS: | PLS - EDW | <u>aim PT</u> : Nom | M 3 EOM | ET RPT | | | | 1844 IDS | FLIGHT DURATION CHANGE: None. |
| 39A-4 | TROZ 4 | Asc - T. W. Holloway | SLS - KSC | MLGTD: 948 FT | IN 5 LOW | 228K | | DEORBIT | | DETLIDNED: | TEIGHT DON'THON OF MINOE. |
| | | Ld/Orb - C. R. Lewis | CLS - NOR | 185:16:09:39.9Z | WEIGHT: | 47:19 MET | | 175 X | | RETURNED: 24492.8 lbs | FIRSTS: |
| | | Plng - J. T. Cox | AOA - EDW | VEL: 196 KGS | 209141 | 47.17 IVIL I | | 160 NM | | 24472.0 103 | - First flight with student experiments. |
| | | | | 204 KEAS | 209141 | ГТ | | TOO INIVI | | SHUTTLE | - First night with student experiments. |
| | | Plng - J. H. Greene | AOA WX - NOR | HDOT: -1.1 FPS | V 00 1000 0 | <u>ET</u> | | VELOCITY | | SHUTTLE ACCUMULATED | CIONIFICANT ANOMALIEC |
| | | Orb/Ent - H. M. Draughon | TAL - DAKAR | | X CG: 1092.9 | | | <u>VELOCITY</u> | | WEIGHTS: | SIGNIFICANT ANOMALIES: |
| | | MOD - E. F. Kranz | TAL WX - ROTA | <u>TD NORM 195</u> : 1758 FT | | 204K | | 25800 FPS | | DEPLOYED: | - Hail stones on tile at L-1 day (repaired tiles). |
| | | | (Selected) | 1758 FT | <u>LANDING</u> | 47:56 MET | | | | 0 lbs | - Water found in thrusters F2R & F4R. |
| | THE RESERVE | | | NII OTD 4000 FT | | | | <u>RANGE</u> | | NON-DEPLOYED: | - During prelaunch rain storms, approximately 500 lbs |
| | -niid | | <u>MAX Q</u> = 721 | NLGTD: 4988 FT 185:16:09:53Z VEL: 158 KGS | WEIGHT: | <u>ET</u> | | 3810 NM | | 63955 lbs | water absorbed by tiles requiring bottom-to-sun for many |
| | | | M = 1.74 | 185:16:09:53Z | 208947 | <u>IMPACT</u> | | | | CARGO TOTAL: 76803 lbs | hours to dry-out water (to prevent ice damage to tile). |
| / M | | | | HDOT: -3.7 FPS | | <u>LAT</u> : | | | | 70003 105 | - GAS activation problems - successful workaround. |
| | | | SRB SEP: | 110013.7113 | X CG: 1094.4 | 28.4°S | | | | PERFORMANCE | - VTR would not rewind. |
| \ 4 | | | 2:10 MET | BRK INIT: 133 KGS | | LONG: | | | | MARGINS (LBS): | - AFT bulkhead actuator on port PLBD stalled during |
| | II was | KOLY-HARTSFIELD | | | | 83.07°E | | | | FPR: 6210 FUEL BIAS: 1474 | latch closure. |
| | | | MECO: | AVE BRK DECEL: | 000 000 | 14. O-l | | | | FUEL BIAS: 1474 | - AFT STBD, FWD port, and FWD bulkhead floodlights |
| 2,2 | | | 8:32.7 MET | 6.4 FPS/S | | 94: Columbia | | | | FINAL TDDP: 4038 | failed. |
| | | | 0.52.7 WET | | Ellington | during retur | n to KS | C. | | RECON: 1195 | - Thermal conditioning required to close PLBD's. |
| | | | ET SEP: | <u>WHEELS STOP</u> : 185:16:10:44Z | | | | | | DDIMADV | - WMS slinger slowed down. |
| | | | 8:50:4 MET | 185:16:10:44Z 10826 FT | | | | | | PRIMARY: DOD 82-1 | - Mid-deck TV camera operation erratic. |
| | | | 0.30.4 IVIL I | 10820 F I | | | | | | ICEM/REM | |
| | | | OMC 1. | ROLLOUT: | | 1 | | MEST CHARLES | | IOLIVI/KLIVI | - DFI PCM recorder data lost. |
| 778 | | | OMS-1: | 9878 FT | | | | | | ANCILLARY: | - Both SRB's lost (impacted water at extremely high |
| | | | 10:32.6 MET | 64 SEC | | | | 145 K 185 A 67 B A | | ANCILLARY: ACIP | velocity). |
| | 100 | | 88 Seconds | | | | | | | GAS | - Right and left inboard brakes damaged. |
| THE SAME | (300) | 200 | | WIND: | | 1 | | Marie Control | | (UTAH STATE) | IFM - GAS EXPERIMENTS RECOVERY |
| | | | <u>OMS-2</u> : | 15H, 7L KNOTS | | | V | | | STUDENT EXP'S: | RADIATORS DEPLOYED #4 |
| + 9 | | | 37:40.6 MET | OFFICIAL: 12H, 1R | | Section 5 | | | | (1) CHOLESTEROL | |
| | S) | | 104 Seconds | DENC ALT. 25/2 | | 18 | | | | (2) CHROMIUM LEVEL | |
| | | | | DENS ALT: 3563 | A STATE OF THE STA | | / | | | (Deficiency) | |
| | | | | 1 1 | | 4 | - // | | | MLR | |
| 1 | 1 | STONIA STONIA | | FLT DURATION: | | 10 | - | | | CFES (MID-DECK) | |
| 100 | - | | | 7:01:09:40 | No. | | | | | ITGF | |
| 1 1 | 200 | | | 169:09:40 | | Mary College | | 0.0 | | NOSL | |
| TATA S | 8 8 | | | | - | | 111111111111111111 | | | | |
| | | | | <u>S/T</u> : 19:13:48:30 | | | | | | 3 CRYO TANK | |
| | | | | 01/ 102 | 2.0 | AL I | | | | SETS | |
| S82-3 | 1207 CD | R Mattingly (right) | | <u>OV-102</u> : 19:13:48:30 | | | | THE RESERVE | | DMC 2 (C N 201) | |
| | | ready to fly fourth | | 17:13:48:30 | | | - | 11 44 | | RMS 3 (S.N. 201) | S04-23-131: Mattingly floats in mid- |
| | | integration of the control | | DISTANCE: | | 15 / L | 1000 | N | | WAVED IECM | dock with compress |

WAVED IECM OUTSIDE P/L BAY

deck with cameras.

<u>DISTANCE</u>: 2,900,000 sm

& final Orbital Flight Test (OFT).

| | OF AGE OF OTTEL MICOTORIO COMMINANT | | | | | | | | | | | | |
|-----------------------------------|--|------------------------------|---|---|--|--|--|--|---------|---|---|--|--|
| FLT | ORBITER | CREW (4) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, | | |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) | | |
| STS-5 SEQ FLT # 5 KSC 5 PAD 39A-5 | OV-102 Flight 5 Columbia OMS PODS LVO1 - 5 FRC2 - 5 | TITLE, NAMES | LANDING SITES, ABORT TIMES KSC 39A 315:12:18:59.997Z 7:19:00 AM EST (P) 7:19:00 AM EST (A) Thursday 2 11/11/82 (2) WINDOW DURATION: 39 Minutes (SBS Day 2 Deploy Opportunity) PLS - EDW SLS - NOR TAL - DAKAR (Selected) TAL WX - None AOA - NOR AOA - NOR AOA WX - KSC CLS - KSC CLS - KSC CLS WX - ROTA MAX Q = 738 M = 1.70 SRB SEP: 2:09.08 MET MECO: 8:30.68 MET ET SEP: 8:48.77 MET OMS-1: 10:30.8 MET 137.8 Seconds OMS-2: | LANDING TIMES FLT DURATION, | THROTTLE PROFILE ENG. S.N. 100/100 (107) 100/85/65 1 = 2007 (5) 2 = 2006 (5) 3 = 2005 (5) SO5-07-2 operation Moving C CDR Bra Allen/MS M 3 EOM WEIGHT: 202643 | AND ET A15/16 MTR: STD CASE: STD 86-80 SWT ET-5 267: First for hal flight, do Co." Clocked had, Lenoir, standard Lenoir | 28.482° (2) 89.8° START: -26.0° END: -7.2° | STANDARD INSERTION INSERTION INSERTION ALTITUDE: POST OMS-2 162.07 X 160.67 NM The state of | R19/T12 | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) KSC W/D: OPF 48, VAB 9, PAD 45= 102 LAUNCH POSTPONEMENTS: None. LAUNCH SCRUBS: None. LAUNCH DELAYS: None. TAL WX:DAKAR GO CLS WX: Rota go. FLIGHT DURATIONS CHANGE: None. FIRSTS: - First operational Shuttle flight First flight with more than 2 crewmen (4) First flight to deploy PAM-D (SBS-C) First OV-102 flight after Micro-Mod including disabling the two ejection seats First flight of OV-102 with ejection seats disabled First Space Shuttle IFM. IFM's: - Switched CRT-2 and CRT-4 cables on FD4 after CRT 2 failed Water hoses used for water dispenser failure. SIGNIFICANT ANOMALIES: - 46-hour STBD side-to-sun EVA canceled, EV-2 (Allen's) suit fan did not operate. EV-1 (Lenoir's) suit regulator was regulating to 3.8 psia instead of 4.3 psia WCCU A & B failed CRT-2 failed (pot in "y" deflection board) Radar altimeter #1 failed FWD port & STBD PLB lights failed High O ₂ flow during PCS switchover LHIB MLG brake locked during landing. | | |
| Flight | | ne MOCR Lead om Holloway, | 44:40.8 MET 117.6 Seconds | FLT DURATION: 5:02:14:26 122:14:26 S/T: 24:16:02:56 OV-102: 24:16:02:56 DISTANCE: 1,850,000 sm | X CG: 1094.8 <u>LANDING</u> WEIGHT: 202480 X CG: 1096.3 | 47:18 MET ET IMPACT LAT: 28.3°S LONG: | | 25758 FPS <u>RANGE</u> 4050 NM | | - SOLUTION XTAL GROWTH - CONVECTION IN ZERO-G GAS, TGE MATERIALS TEST ZERO-G DEMO 3 CRYO TK SETS NO RMS | - OMS nozzle cracks found postflight. RADIATORS DEPLOYED #5 (for SUN SIDE attitude only) | | |

| SPACE SHUTTEE MISSIONS SUMMART | | | | | | | | | | | |
|---|--|---|---|---|--|--|--|----------|--|--|--|
| OPRITER | CREW (4) | LAUNCH SITE, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB | | ORBIT | FSW | PAYLOAD WEIGHTS | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, | |
| GRETTER | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | 1011 | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) | |
| OV-099 Flight 1 Challenger OMS PODS LPO1 - 1 RPO1 - 1 FRC9 - 1 | CDR: Paul J. Weitz P13/R13/M13 PLT: Karol J. Bobko P14/R14/M14 M/S: F. Story Musgrave P15/R15/M15 M/S: Donald H. Peterson P16/R16/M16 EMU/TETHERED EVA: EVA: 4/7/83 EV1-Musgrave EV2-Peterson EVA1=3:54/4:42 Space Shuttle EVA #1 EVA HARDWARE CHECKOUT MCC FCR-2 (2) FLIGHT DIRECTORS: Ascent - J. H. Greene Orb/Ent - G. E. Coen | KSC 39A 94:18:30:00.016Z 1:30:00 PM EST (P) 1:30:00 PM EST (A) Monday 2 4/4/83 (2) WINDOW DURATION: 17 Minutes (TAL Lighting) TAL - DAKAR NO TAL WX AOA - EDW AOA WX - NOR EOM - EDW MAX Q = 688 M = 1.47 SRB SEP: 2:09.4 MET MECO: 8:19.4 MET ET SEP: 8:37.55 MET OMS-1: | EDW 22 CONC (EDW 5, CONC 3) 10:53:42 AM PST Saturday 2 4/9/83 (2) XRANGE: 378 NM ORB DIR: AL (1) AIM PT: CLOSE IN MLGTD: 2026 FT 99:18:53:42Z VEL: 180 KGS 190 KEAS HDOT: -1.5 FPS TD NORM 195: 1576 FT NLGTD: 4970 FT 99:18:53:54Z VEL: 146 KGS HDOT: -3.9 FPS BRK INIT: 136 KGS AVE BRK DECEL: 7.3 FPS/S WHEELS STOP: 99:18:54:31Z 9270 FT ROLLOUT: 7180FT 49 SEC WIND: 21H, 5L KNOTS OFFICIAL: 12H, 3L | ENG. S.N. 104/104 (109) 100/104/81/ 104/65 1 = 2017 (1) 2 = 2015 (1) 3 = 2012 (1) CENTER WAS 2011 | A17/18 MTR: STD CASE: LWC 86-80 231-81 LWT-1 ET-8 to man Challe) and PLT Bo MS (left) and ET RPT | bko. Sta | INSERTION INSERTION ALTITUDE: POST OMS-2 155.45 X 154.48 NM Geated are CDF Inding are | | CARGO: 46971 lbs CHARGEABLE: 46662 lbs DEPLOYED: 37546 lbs NON-DEPLOYED: 6853 lbs ANCILLARY P/L: 2263 lbs RETURNED: 9462 lbs SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 52131 lbs NON-DEPLOYED: 79316 lbs CARGO TOTAL: 155854 lbs PERFORMANCE MARGINS (LBS): FPR: 5720 FUEL BIAS: 1298 FINAL TDDP: 4755 RECON: 2463 PRIMARY: TDRS-A/IUS-2 | KSC W/D: OPF 123, VAB 6, PAD 115=244 LAUNCH POSTPONEMENT: - 1/20/83 launch postponed 74 days to 4/4/83 because of H2 leak in aft compartment from engine 2011 (SSME #1) during FRF 1. Post-FRF 2 found crack in MCC of 2011. 2015 and 2012 had cracked ASI fuel lines. Replaced ASI lines in all three engines. 74-day slip for engine analysis and fixes. LAUNCH SCRUBS: None. LAUNCH DELAYS: None. TAL WX: Dakar no go - haze. FLIGHT DURATION CHANGE: None. FIRSTS: - First flight of OV-099 First Flight with HUD First EVA on Shuttle Program First use of SRB LWT case First use of LWT ET. SIGNIFICANT ANOMALIES: - TDRS deploy at MET 10:00:01 (Rev 6). IUS problem resulted in TDRS being left in 22000 × 12000 NM orbit. TDRS was maneuvered into geosync orbit using 1 lb attitude thrusters IUS problem with TVC TPS damage AFRSI on OMS PODS, slumping tiles on nose cap and aero surfaces Humidity separator failed (6 wires shorted) High flow on 02 and N2 systems WCCU A & B failed GPC 2 failed. | |
| | ttle EVA: Musgrave n cargo bay. | | DENS ALT: 3177 FT FLT DURATION: 5:00:23:42 120:23:42 S/T: 29:16:26:38 OV-099: 5:00:23:42 DISTANCE: 1,820,000 sm | LANDING WEIGHT: 190330 | 46:19 MET ET BR/UP 223K 46:42 MET ET IMPACT LAT: 28.3°S LONG: | | DEORBIT 155 X 147 NM VELOCITY 25756 FPS RANGE 4056 NM | | ANCILLARY: MLR CFES (MIDDECK) NOSL GAS (3) IN BAYS 3 & 4: - JAPANESE SNOWFLAKE 3 CRYO TANK SETS NO RMS | - Teleprinter failed WMS slinger failed on day 5 CRT-3 failed Gas path through putty on both SRM nozzle-to-case joints. IFM - Removed and stowed CCTV monitors. | |
| | OMS PODS LPO1 - 1 RPO1 - 1 FRC9 - 1 | ORBITER TITLE, NAMES & EVA'S OV-099 Flight 1 Challenger Paul J. Weitz P13/R13/M13 PLT: Karol J. Bobko P14/R14/M14 OMS PODS LPO1 - 1 FRC9 - 1 RPO1 - 1 FRC9 - 1 M/S: Donald H. Peterson P16/R16/M16 M/S: Donald H. Peterson P16/R16/M16 EMU/TETHERED EVA: EVA: 4/7/83 EV1-Musgrave EV2-Peterson EVA1=3:54/4:42 Space Shuttle EVA #1 EVA HARDWARE CHECKOUT MCC FCR-2 (2) FLIGHT DIRECTORS: Ascent - J. H. Greene Orb/Ent - G. E. Coen Ld/Orb - H. M. Draughon Planning - B. R. Stone | CREW (4) | CREW (4) LAUNCH SITE, RUWWAY, CROSSRANGE LANDING SITE/RUWWAY, CROSSRANGE LANDING SITES, ABORT TIMES LANDING TIMES | CREW (4) | CREW (4) LAUNCH SITE, UFTOFF TIME, UTTOFF TIME, UFTOFF TIME, UFTOF | CREW (4) LAUNCH SITE, ILTOFF TME, ILTO | CREW (4) | CREW (4) LAUNCH SITE (4) LAUNCH SITE (4) LAUNCH SITE (4) LB TOFF TIME (CROSSRANGE LAUNWAY CROSSRANGE LAUNDING TIMES (ADDIT TIMES ADDIT TIMES (ADDIT TIMES ADDIT TIMES ADDIT TIMES (ADDIT TIMES ADDIT TIMES ADDIT TIMES ADDIT TIMES (ADDIT TIMES ADDIT TIMES ADDIT TIMES ADDIT TIMES (ADDIT TIMES ADDIT TIMES ADDI | CREW LAUNCH SITE. LANDING SHE PAVI ADD PAVI A | |

| | SPACE SHOTTEE MISSIONS SOMMAKT | | | | | | | | | | | | |
|---------------------|----------------------------------|---|--|--|----------------------------------|--|--------------------------|--|---------|---|--|--|--|
| FLT | ORBITER | CREW (5) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, | | |
| NO. | -ORBITER | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | 1300 | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) | | |
| STS-7 | OV-099 Flight 2 | CDR: Robert L. Crippen | KSC 39A 169:11:33:00.33Z | EDW 15, LAKEBED (EDW 6, LKBD 3) | 104/104 (109) | | | STANDARD INSERTION | R19/T12 | | KSC W/D: OPF 34, VAB 5, PAD 21=60 | | |
| SEQ FLT # 7 | Challenger | (Flt 2 - STS-1) P17/R2/V1/M2 | 7:33:00 AM EDT (P) 7:33:00 AM EDT (A) Saturday 1 | 6:56:59 AM PDT Friday 1 6/24/83 (1) | 100/104/75/104 /65 | | <u>START</u> : +17.5° | INSERTION ALTITUDE: | | CHARGEABLE: 31893 lbs | LAUNCH POSTPONEMENTS: None. LAUNCH SCRUBS: None. | | |
| KSC 7 | OMC DODC | PLT: Frederick H. Hauck | 6/18/83 (2) PLS - KSC | <u>XRANGE</u> : 738 NM | 1 = 2017 (2) | | <u>END</u> : | POST OMS-2 161 X 159.96 NM | | ANCILLARY P/L: 3942 lbs DEPLOYED: | LAUNCH DELAYS: None. | | |
| <u>PAD</u> 39A-7 | OMS PODS LPO1 - 3 RPO1 - 3 | P18/R17/M17 M/S 1: | SLS - EDW TAL - DAKAR | ORB DIR: DL (3) AIM PT: NOM | 2 = 2015 (2) 3 = 2012 (2) | | +41.0° <u>MAX</u> : | <u>TELESAT</u> | | DEPLOYED: 14949 lbs NON-DEPLOYED: 13002 lbs | TAL WX: Dakar go. | | |
| | FRC9 - 3 | John M. Fabian (Rt. Rear Seat) P19/R18/M18 | CLS - ROTA AOA - EDW AOA WX - KSC | MLGTD: 2726 FT 175:13:56:59Z | | | | DEPLOY 162.21 NM | | 13002 lbs <u>RETURNED</u> : 22175 lbs | LANDING SITE CHANGE: - KSC to EDW (Poor visibility at KSC). | | |
| CHAI | INGIR | <u>M/S 2</u> : | EOM - KSC | VEL: 200 KGS 202 KEAS HDOT: -1.1 FPS | | | | PALAPA DEPLOY 162.61 NM | | SHUTTLE ACCUMULATED | FLIGHT DURATION CHANGE: - Extended 1 day from 5 to 6 days plus 2 revs to land | | |
| | | Sally K. Ride (Center Seat) P20/R19/F1 | <u>MAX Q</u> = 701 M = 1.56 | <u>TD NORM 195</u> : 3356 FT | (rt): CDR (| Crippen (1s | t Shut | r crew: In rear (le veteran re-fli Front: Ride/MS | ght), | WEIGHTS: DEPLOYED: 67080 lbs NON-DEPLOYED: | at EDW. FIRSTS: | | |
| | | <u>M/S 3</u> : Norman E. Thagard | <u>SRB SEP</u> : 2:06.2 MET | <u>NLGTD</u> : 6843 FT 175:13:57:19Z | U.S.Femal | e astronau | t) & Th | nagard/MS. | (1St | 96260 lbs <u>CARGO TOTAL</u> : 192978 lbs | First flight with 5 crewmembers. First US flight with female astronaut. First payload deployed and retrieved same flight | | |
| No. | HALE'S PO | (Middeck Seat) P21/R20/M19 | MECO: 8:20.1 MET | VEL: 158 KGS HDOT: -5.1 FPS | | @ # @ @ | जुना है | | | PERFORMANCE MARGINS (LBS): FPR: 5539 | (SPAS-01) First PROX OPS and reberthing of payload (SPAS- | | |
| | | MCC FCR-2 (3) | ET SEP: 8:38.2 MET | BRK INIT: 125 KGS AVE BRK DECEL: 3.6 FPS/S | TO LO STICHE CO. | A THE PERSON NAMED IN COLUMN TO PERSON NAMED | any city | | lulia | FPR: 5539 FUEL BIAS: 1603 FINAL TDDP: 2940 RECON: 2021 | First flight with Ku-band antenna (Ku-band not used). First planned landing at KSC. | | |
| | | <u>FLIGHT DIRECTORS</u> : Ascent - J. H. Greene | OMS-1: 10:20.2 MET | WHEELS STOP: 175:13:58:14Z | | | | | | PRIMARY: TELESAT-F/ PAM-D | - First PROX OPS (with SPAS-01). EVENTS: | | |
| | | Ld/O1 - T. W. Holloway Orbit 2 - J. T. Cox | 139.5 Seconds | 13176 FT | | | | | 1 | (ANIK-C) DEPLOYED PALAPA-B1/PAM-D DEPLOYED | - TELESAT-F deployed on rev 4 PALAPA-B1 deployed on rev 15. | | |
| W. | | PIng - L. S. Bourgeois Entry - G. E. Coen MOD - E. F. Kranz | OMS-2: 44:30.2 MET 120 Seconds | ROLLOUT: 10450 FT 75 SEC | | | | | | SPAS-01 DEPLOYED AND RETRIEVED | SIGNIFICANT ANOMALIES: - Reduced cabin pressure demonstration (10.2 PSIA). | | |
| | | | | <u>WIND</u> : 9H, 8R KNOTS OFFICIAL: 10H, 3R | <u>M 3 EOM</u> | ETRPT 233K 46:20 MET | | DEORBIT 159 X | | CFES, MLR OSTA-2: | - Bus-tie demonstration post-landing fired one set of PYROS for MLG uplock release. | | |
| | | | | <u>DENS ALT</u> : 3000 FT | WEIGHT: 204340 | ET BR/UP | | 154 NM | | (MPE,MEA,MAUS) GAS-G002,G305, G009,G033,G088,G012 AND G345 | right braking system damaged. | | |
| | | Total Control | (BS00) | <u>FLT DURATION</u> : 6:02:23:59 146:23:59 | X CG: 1089.8 | 188K 47:18 MET | | VELOCITY 25771 FPS | | ANCILLARY: MLR | APU 3 underspeed shutdown on-orbit. Locker and cabin door misalignment problems. Right inboard MLG brake damage. | | |
| | | 自由 | | <u>S/T</u> : 35:18:50:37 | <u>LANDING</u> WEIGHT: | T/V OFF ET IMPACT | | RANGE 4042 NM | | CFES (MID-DECK) GAS (7) BAYS 2-5 STUDENT EXP. | - Challenger window replaced after orbital debris impact. | | |
| Directo | or & Cliff Char | : S83-36179 Gene I resworth/MOD in ba os/FIDO. Rt Bottom | ack. Left Bottom: | <u>OV-099:</u> 11:02:47:41 | 204043 | <u>LAT</u> : 28.35°S | | | | 3 CRYO TK SETS RMS 4 (S.N. 201) | | | |
| | | astronaut Gordon (| | <u>DISTANCE</u> : 2,220,000 sm | X CG: 1091.2 | <u>LONG</u> : 83.7°E | | | | Deployed and retrieved SPAS-01 | | | |

| | | | • | FACE SI | 10116 | L MIOC | | O OOM | | X I | · · |
|-----------------------------------|---|---|---|---|--|---|---|---|------------|---|--|
| FLT | ORBITER | CREW (5) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-8 SEQ FLT # 8 KSC 8 PAD 39A-8 | OV-099 Flight 3 Challenger OMS PODS LPO1 - 2 RPO1 - 2 FRC9 - 2 | | ABORT TIMES KSC 39A 242:06:32:00.009Z 2:15:00 AM EDT (P) | FLT DURATION, WINDS EDW 22, CONC (EDW 7, CONC 4) 248:07:40:43 Z 12:40:43 AM PDT Monday 1 9/5/83 (1) XRANGE: 519 NM ORB DIR: DL (4) AIM PT: NOM MLGTD: 2793 FT 248:07:40:43 Z VEL: 196 KGS 195 KEAS HDOT: -1.2 FPS TD NORM 195: 2793 FT NLGTD: 5515 FT 248:07:40:50 Z VEL: 177 KGS HDOT: -4.3 FPS BRK INIT: 154 KGS AVE BRK DECEL: 6.9 FPS/S WHEELS STOP: 248:07:41:33 Z 12164 FT ROLLOUT: 9371 FT 50 SEC WIND: 7H, 0X KNOTS OFFICIAL: 5H, 2L DENS ALT: 3600 FT FLT DURATION: 6:01:08:43 145:08:43 145:08:43 | PROFILE ENG. S.N. 100/104 (104) 100/69/ 100/65 1 = 2017 (3) 2 = 2015 (3) 3 = 2012 (3) S83-317 Branden: African Atort): Ga At Right: | A53/54 MTR: HPM CASE: STD LWT-2 ET-9 24 Crew: Istein, CDR T | 28.488 (5) START: -36.2° END: +29.4° MAX: +37.0° | STANDARD INSERTION INSERTION ALTITUDE: POST OMS-2 161.07 X 160.14 NM INSAT DEPLOY 159.18 NM W (It to rt) PLT Bluford/MS (1 ce). Back rov /MS. | T st w (It | CARGO: 30076 lbs PAYLOAD CHARGEABLE: 25790 lbs DEPLOYED: 7445 lbs NON-DEPLOYED: 13179 lbs ANCILLARY: 5166 lbs RETURNED: 22631 lbs SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 74525 lbs NON-DEPLOYED: 14605 lbs CARGO TOTAL: 223054 lbs PERFORMANCE MARGINS (LBS): FPR: 6756 FUEL BIAS: 780 FINAL TDDP: 14863 RECON: 15735 PRIMARY: INSAT-TB/PAM-D (DEPLOYED) RMS/PDRS/PFTA DFI PALLET (HEAT PIPE EXPERI- MENT, 2 BOXES OF POSTAL COVERS), RME EXP, EOM ANCILLARY: CFES (MIDDECK) GAS (3) BAYS 2-8 GAS (4) BAY 5 BIO-FEEDBACK ANIMAL FNCI OSURF | KSC W/D: OPF 26, VAB 4, PAD 25 = 55 LAUNCH POSTPONEMENTS: - 8/4/83 launch postponed 26 days to 8/30/83 due to removal of TDRS-B from flight (IUS not ready because of problem on STS-6) and time required to checkout TDRS-A on orbit. 26-day slip. LAUNCH SCRUBS: None. LAUNCH DELAYS: - 00H17M delay because of thunderstorms in launch area. TAL WX: Dakar go. FLIGHT DURATION CHANGE: None. FIRSTS: - First Shuttle night launch First Shuttle night landing First flight to use TDRS for communications (test mode) First flight to use Ku-band communications First flight using SRM HPM Bluford became the first African-American to fly in space. He was selected in the first class of Space Shuttle astronauts. EVENTS: - Tile survey of Orbiter bottom made using RMS End Effector TV camera INSAT-1B deployed on rev 27. SIGNIFICANT ANOMALIES: - Completed all 54 DTO's and DSO's planned for flight Hydraulic circulation pump 2 failed - GPC-1 failed to sync (recovered OK) - WCCW A wall unit failed, B&E noisy CCTV C command problems & out of focus CCTV D failed TAGS failed Rt outboard brake had 3 cracked washers and right inboard had one cracked washer Nose gear thruster piston found on runway LH and RH SRB nozzles experienced off-nominal |
| Gerry (Kranz, rear & | Griffin visits the Director, Mis | enter Director ne MOCR. Gene ision Ops is in or Jay Greene is identified. | | S/T: 41:19:59:20 OV-099: 17:03:56:24 DISTANCE: 2,220,000 sm | LANDING WEIGHT: 203945 X CG: 1091.9 | ET IMPACT LAT: 28.4°S LONG: 81.5°E | | DEORBIT 118 X 116 NM VELOCITY 25649 FPS RANGE 4044 NM | | POSTAL COVERS 3 CRYO TK SETS RMS 5 (S.N. 201) USED FOR PFTA OPS | erosion SRB nozzle erosion was found after recovery RH mid window (W5) pitted. RADIATORS DEPLOYED #6 (for 2 days) |

| | | | | CL SHUI | | | IOI | <u> </u> | IVIAI | <u> </u> | |
|--|--------------------|---|-----------------------|------------------------------------|----------------|---------------|----------|--|--------|------------------------------------|---|
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
| | | (6) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (0) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | & EVA 3 | | WINDS | ENG. S.N. | | | | | | |
| STS-9 | OV-102 | CDR: | KSC 39A | EDW 17, LAKEBED | 104/104 | A55/60 | 57.028° | <u>STANDARD</u> | OI-2 | CARGO: | KSC W/D: OPF 82 (2), VAB 12 (3), PAD 34 (2) = 128 days |
| (STS 41-A) | Flight 6 | John W. Young | 332:15:59:59.99Z | (EDW 8, LKBD 4) | (107) | | (1) | <u>INSERTION</u> | (1) | 33264 lbs | |
| S/L1 | Columbia | (FLT 2 - STS-1) | 11:00:00 AM EST (P) | 15:47:24 PM PST | | MTR: | | | | <u>PAYLOAD</u> | LAUNCH POSTPONEMENTS: |
| 0,21 | | P27/R1/V3/M1 | 11:00:00 AM EST (A) | Thursday 1 | 100/104/ | HPM | START: | INSERTION | | CHARGEABLE: | -10/30/83 Launch postponed 29 days to 11/28/83. |
| SEQ | Spacelab 1 | | Monday 3 | 12/8/83 (1) | 78/104/65 | | -58.0° | ALTITUDE: | | | Rolled back from pad and changed SRB nozzles |
| FLT # 9 | LM (1) | PLT: | 11/28/83 (3) | 12/0/00 (1) | | CASE: | | | | <u>PAYLOAD</u> | subsequent to STS-8 excessive nozzle erosion. 29-day |
| 1 = 1 " / | 1 | Brewster H. Shaw, Jr. | ` ' | XRANGE: 69 NM | 1 = 2011 (1) | STD | END: | POST OMS-2 | | WEIGHT: | slip. |
| KSC 9 | OMS PODS | P28/R25/M24 | LAUNCH WINDOW: | | 2 = 2018 (1) | | -79.0° | 136.75 X | | 33,131 lbs | LAUNOU CODURC Name |
| 130 7 | LVO1 - 6 | | 14 Minutes | ORB DIR: DL (5) | 3 = 2019 (1) | LWT-4 | | 132.79 NM | | (includes 870 lbs | <u>LAUNCH SCRUBS</u> : None. |
| ΡΔΠ | RVO1 - 6 | <u>M/S 1</u> : | (TAL Lighting) | <u>aim PT</u> : NOM | ` ' | | MAX: | | | cryo tank) | LAUNCH DELAYS: None. |
| <u>PAD</u> 39A-9 | FRC2 - 6 | Owen K. Garriott | 3 3/ | Alivi F I. INOIVI | | ET-11 | -79.9° | | | DEPLOYED: | LAUNCH DELATS. None. |
| 37A-7 | | P29/R26/M25 | TAL - ZARAGOZA | MLGTD: 1649 FT | | | | | | 0 lbs | TAL WX: Zaragoza no go - winds, Koln-Bonn no go - |
| | | | PLS - EDW | 342:23:47:24Z | 461 | 260 | 4 | 19 /11 | 5 | NON-DEPLOYED: | clouds. |
| | | M/S 2: | SLS - NOR | VEL: 200 KGS | | | | | 10 | 32261 lbs | ciouus. |
| | (MO - Distance | Robert A. R. Parker | TAL - ZARAGOZA | 185 KEAS | | 6 | | The state of | | | FLIGHT DURATION CHANGE: |
| 100 | | P30/R27/M26 | IN PLANE TAL - | HDOT: -1.7 FPS | | | | | 9 | MIDDECK: | - Flight extended 1 day for additional science. |
| | | 1 30/1(27/10/20 | COLOGNE/BONN | TD NODM 10E. | 178 | - | 67 | | | 0 lbs | - Landing delay 5 revs after GPC 1 and GPC 2 hard |
| | | P/S 1: | AOA - NOR | <u>TD NORM 195</u> : 749 FT | Will a | 00 | | 0 | - | RETURNED: | failures |
| 8 | 1 To 1 To 1 | Byron K. Lichtenberg | AOA WX - NONE | 74711 | | | | | | 32394 lbs | - Total extension - 1 day + 5 revs. |
| | 1 | P31/R28/M27 | AOA WA - NONE | NLGTD: 5897 FT | | | · | | 1 1 | CULITTLE | , |
| 1 | | 1 31/1(20/10/27 | MAX Q = 676 | 342:23:47:377 | | - | (20) | N INCOME. | | SHUTTLE ACCUMULATED | FIRSTS: |
| | | <u>P/S 2</u> : | M = 1.52 | VEL: 146 KGS HDOT: -9.9 FPS | 3 | ACC. | | 分 加泽(1) | | WEIGHTS: | - First flight with 6 crewmen. |
| Column | 100 | Ulf Merbold | IVI - 1.32 | HDO1: -9.9 FPS | | | 25 | | -3 | DEPLOYED: | - First flight of Spacelab after Spacelab only |
| | ia · Spar | (Germany) | SRB SEP: | BRK INIT: 126 KGS | | .1 | No. | A STATE OF THE STA | | 74525 lbs | modifications to OV-102. |
| | | P32/R29/M28 | 2:06.24 MET | | | # | | No. of the last of | | NON-DEPLOYED: | - First flight with non-astronauts (P/S) and first non- |
| | | F 32/K29/IVI20 | 2.00.24 IVIL I | AVE BRK DECEL: 6.8 FPS/S | | | 3 | 1 | 1.0 | 147736 lbs | Americans. |
| | | MCC FCD 2 (F) | MECO. | 6.8 FPS/S | | | - 1 | | ALC: U | CARGO TOTAL: | - First use of two shifts of 12 hours (red and blue shifts). |
| | | MCC FCR-2 (5) | MECO: 8:29.18 MET | WILLELS STOD. | | | | | | 256318 lbs | - First flight with galley and sleep station. |
| | | FLIGHT DIRECTORS: | 8:29.18 IVIE I | WHEELS STOP: 342:23:48:17Z | S09-126-0 |)44: Fir | st 6 me | mber crew, fi | rst | <u>PERFORMANCE</u> | - First flight with 3 substack fuel cells. |
| | | Ascent - J. H. Greene | ET CED. | 10105 FT | non-astro | nauts (F | P/S) and | d first non- | | MARGINS (LBS): | |
| | | | ET SEP: | | Americans | s. and 3 | 3rd Shu | ttle veteran (0 | CDR | FPR: 5404 | SIGNIFICANT ANOMALIES: |
| | | Ld/Orb 1 - C. R. Lewis | 8:47.32 MET | ROLLOUT: | | | | dentified in Co | | FUEL BIAS: 1084 FINAL TDDP: 841 | - GPC SV time tag to S/L incremented by 1 day. |
| | | Orb 2 - J. T. Cox | OMC 1. | 8556 FT | . 53.19) 10 | 9.11. | 3.311 | | | RECON: -411 | - Ku-band TWT failed to come on (low temp problem). |
| | | Orb 3 - L. S. Bourgeois | OMS-1: 10:29.3 MET | (10105 FROM THRESHOLD) | | | | | | | - Spacelab RAU 21/cooling problem. |
| | | Team4/Ent - G. E. Coen | | 53 SEC | | | | | | SPACELAB-1/LM | - Excessive GH ₂ in water. |
| 一等的指定 | MARKET | | 00.0 000000 | | | | | | | SPACELAB 1 | - S-band power amp no. 2 failed Noises and oscillations reported by crew. |
| | | | 0140.0 | <u>WINDS</u> : 0 H/T, O X KNOTS | | | | | | WITH 73 EXP: | - Noises and oscillations reported by crew. |
| 1911 | | | OMS-2: | 0 H/T, O X KNOTS | MAROM | | | | | - ASTRONOMY | - GPC 1 hard failure GPC 2 failure, re-IPL'ed, memory |
| White the | | 1 The Late of the | 40:37.4 MET | OFFICIAL: 1T, OX | M 3 EOM | ЕТ | | DEODDIT | | - SOLAR PHYSICS | altered, failed again at NLG contact (delayed landing 7- |
| 10 8 1 | | | 101.6 Seconds | DENS ALT: 1900 FT | | ET | | <u>DEORBIT</u> | | - SPACE PLASMA - ATMOSPHERIC | 3/4 hours). |
| | | | | <u>DENS ALI</u> . 1900 I I | WEIGHT: | BR/UP | | 129 X | | PHYSICS | - IMU 1 failed (power supply failure). |
| | 1 | | | FLT DURATION: | 220288 | 199K | | 124 NM | | - EARTH | - APU 1 and 2 hydrazine leak/fire shutdown after landing |
| | (OID) | 1915/12 | | 10:07:47:24 | | 1:01:00 | | | | OBSERVATIONS | (APU 1 and 2 damaged). |
| 19 M. J. | | (6) | | 247:47:24 | X CG: 1085.8 | MET | | VELOCITY | | - LIFE SCIENCES | - Right outboard brakes damaged. - LH OMS pod TPS damage during entry. |
| 3 | | | | S/T: 52:03:46:44 | | | | 25696 FPS | | - MATERIAL | - LH OWS pod 1PS damage during entry Mission extended one day. 8 hours extension to |
| | | | | <u>3/1</u> . 32.03.40.44 | <u>LANDING</u> | <u>ET</u> | | | | SCIENCES | analyze GPC and IMU failures. |
| | 1 | | | OV-102: | | IMPACT | | <u>RANGE</u> | | 5 CRYO TANKS | - LH OMS pod removed for repair after burn-through |
| A A | | | | 34:23:50:20 | WEIGHT: | <u>LAT</u> : | | 4349 NM | | NO DMC | (missing tile). |
| s9-32-1 | 112 First | flight of Spacelab | | DISTANCE | 220027 | 59.96°S | | | | | (missing tile). |
| | | modifications to OV- | | DISTANCE: | | LONG: | | | | | RADIATORS DEPLOYED #7 (stowed for 34 hours) |
| 102. | L. D. C. C. C. II. | | | 3,330,000 sm | X CG: 1087.1 | 149.9°E | | | | | |
| . 32. | | | | | | | | | | | |

| | | | <u> </u> | | | | | | | | |
|--------------|---------------------------------------|---|------------------------|-------------------------------------|-----------------------|--|-----------|--|------|--|--|
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
| | | (5) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (8) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | | | WINDS | ENG. S.N. | | | | | | |
| STS-11 | OV-099 | CDR: | KSC 39A | KSC 15 | 100/104 | A57/58 | 28.486° | STANDARD | OI-2 | CARGO: | KSC W/D: OPF 52, VAB 6, PAD 21=80 |
| (STS 41-B) | Flight 4 | Vance D. Brand | 34:12:59:59:998Z | (KSC 1) | 109 | | (6) | INSERTION | (2) | 33868 lbs | |
| (, | Challenger | (FLT 2 - STS -5) | 8:00:00 AM EST (P) | 7:15:55 AM EST | | MTR: | | | | CHARGEABLE: 28252 LBS | LAUNCH POSTPONEMENTS: |
| SEQ | | P33/R9/V4/M9 | 8:00:00 AM EST (A) | Saturday 3 | 100/73/ | HPM | START: | INSERTION | | 28252 LBS | - 1/24/84 launch was postponed 10 days to 2/3/84 |
| FLT # 10 | OMS PODS | PLT: | Friday 1 | 2/11/84 (1) | 100/65 | | -26.9° | ALTITUDE: | | DEDLOVED: | because of ongoing analysis of APU failures on STS-9. |
| KSC 10 | LPO1 - 4 | Robert L. Gibson | 2/3/84 (1) | 2/11/01(1) | | CASE: | | | | DEPLOYED: 15073 LBS | 10-day slip. |
| 100 10 | RPO1 - 4 | P34/R30/M29 | , , | XRANGE: 524 NM | 1 = 2109 (1) | MWC | END: | POST OMS-2 | | | LAUNCH SCRUBS: None. |
| PAD | FRC9 - 4 | 1 6 WKOGIWIZY | LAUNCH WINDOW: | | 2 = 2015 (4) | | +4.5° | 165.88 X | | NON-DEPLOYED: 10198 lbs | LAUNCH SCRODS. Notic. |
| 39A-10 | | <u>M/S 1</u> : | 13 Minutes | ORB DIR: DL (6) | 3 = 2012 (4) | LWT-3 | | 164.61 NM | | 10170 103 | LAUNCH DELAYS: None. |
| 077110 | | Bruce McCandless II | (PALAPA SUN | AIM PT: CLOSE IN | | ET-10 | MAX: | | | ANCILLARY: 2981 lbs | |
| | | P35/R31/M30 | SHIELD FAIL OPEN) | AINT 1. CLOSE IIV | | <u>ET</u> | | PALAPA DEPLOY | | 2981 lbs | TAL WX: Dakar no go - visibility. |
| 0 | HALLENGER | M/S 2: | · | MLGTD: 1930 FT | | RPT | | 166.48 NM | | RETURNED: | FLIGHT DURATION CHANGE: None. |
| (b) | (A) | Ronald E. McNair | PLS - KSC | 42:12:15:55Z | | 231K | | | | RETURNED: 18795 LBS | I LIGHT DUKATION CHANGE; NOITE. |
| 1 | 1 | P36/R32/M31 | SLS - EDW | VEL: 198 KGS | <u>M 3 EOM</u> | 46:26 | | WESTAR | | SHUTTLE | FIRSTS: |
| | | X | TAL - DAKAR | 196 KEAS HDOT: -2.0 FPS | | MET | | <u>DEPLOY</u> | | <u>ACCUMULATED</u> | - First use of Manned Maneuvering Unit (MMU) on EVA. |
| AND GREET | NAME STEWN | M/S 3: | NO TAL WX | 110012.011 3 | WEIGHT: | <u>ET</u> | | 153.52 NM | | WEIGHTS: | - First untethered EVA crewman on Shuttle flight (320 |
| | MCANDLESS MAN | Robert L. Stewart | CLS - KSC | TD NORM 195: | 201529 | BR/UP | | | | DEPLOYED: 89598 lbs | foot separation from Orbiter). |
| | Albert Trades | P37/R33/M32 | CLS - EDW | 2020 FT | | 214K | | <u>DEORBIT</u> | | NON-DEPLOYED: | - First use of 10.2 PSIA cabin for EVA prep. |
| | | UNTETHERED EVA'S | AOA - EDW | 0.75 5700 57 | X CG: 1087.9 | 46:51 | | 157 X | | 160915 lbs | - First use of MFR on RMS. |
| | | MMU: | AOA WX - NOR | NLGTD: 5789 FT | | MET | | 145 NM | | CARGO TOTAL: 290186 lbs | - First landing at KSC. |
| MCC FCR | -2 (6) | EV1=McCandless | EOM - KSC | 42:12:16:06Z VEL: 159 KGS | <u>LANDING</u> | <u>ET</u> | | | | 270100103 | - First flight with spare GPC in locker (STS-9 GPC |
| WOOT OIL | 2 (0) | EV2=Stewart | | HDOT: -2.8 FPS | | IMPACT | | <u>VELOCITY</u> | | PERFORMANCE | failures reaction). |
| FLIGHT DI | RECTORS: | EVA4 E 05// 05 | <u>MAX Q</u> = 676 | | WEIGHT: | <u>LAT</u> : | | 25752 FPS | | MARGINS (LBS): FPR: 5259 | EVENTS: |
| Asc/Ent - 0 | | EVA1=5:35/6:05 | M = 1.55 | BRK INIT: 136 KGS | 201239 | 28.3°S | | | | FUFL BIAS: 1038 | - Made Orbiter maneuver to recover foot restraint in PLB. |
| Orbit 1 - B. | | 2/7/84 SS EVA #2 | | AVE DDK DECEL | | LONG: | | <u>RANGE</u> | | FINAL TDDP: 12062 | - PALAPA-B deployed on rev 6. |
| Ld/O2 - H. | M. | EVA2=6:02/6:17 | SRB SEP: | AVE BRK DECEL: 5.1 FPS/S | X CG· 1089 3 | 80 6°F | | 4137 NM | | RECON: 6961 | - WESTAR-IV deployed on rev 48. |
| Draughon | . Bourgeois | 2/9/84 SS EVA #3 | 2:07.92 MET | 3.111 3/3 | | Firet I | anding | ot KSC | | PRIMARY: | - Saw Challenger entry trail from Houston during landing |
| EVA - J. T. | . Dourgeois | FIDOT UNITETUEDED EVA | MEGO | WHEELS STOP: | | FIISU | _anumy | at NOC | | WESTAR-IV/ PAM-D (DEPLOYED) | at KSC. |
| LVA - 3. 1. | CUX | FIRST UNTETHERED EVA'S: | MECO: | 42:12:17:02 | Contractor Contractor | 1000 | | | | ` ´ | |
| | | FREE FLYER EVA'S #1 & # 2 MMU CHECKOUT EVA'S | 8:41.42 MET | 12737 FT | and the same in | - | - | The state of the s | 100 | PALAPA-B2 / PAM-D | RENDEZVOUS: |
| | 1.10 | | ET CED. | ROLLOUT: | 100000 | No. of Contract of | | - | | (DEPLOYED) | - Canceled planned RNDZ when IRT failed. |
| In back: | MS's/Stewa | rt, McNair & McCandless | ET SEP: 8:59.57 MET | 10,815 FEET | THE REAL PROPERTY. | | | | - | SPAS 01A | SIGNIFICANT ANOMALIES: |
| - (I) | | | 8:59.57 IVIE I | 64 SEC | | | - | | | MFR PLATFORM | - RMS wrist joint failure (RMS/SPAS-01 operations |
| | | | OMS-1: | MINDO | | - | | | | MMU (2) MMU/EMU | canceled). RMS used for PALAPA PKM burn witness |
| | | eg | | WINDS: | | | | | | CINEMA 360 | plate ops. |
| A | | | 150 Seconds | 5H, 3L KNOTS OFFICIAL: 3T, 2L | | | | | = (| (BAY 5) CINEMA 360 | - Left OMS POD damage from waste water dump nozzle |
| 1 | | | 130 3500103 | 01 1 1011 IL. 31, 2L | | | 1 | | | (MID-DECK) | ice (during entry). |
| XX | NAS- | | OMS-2: | DENS ALT: -200 FT | 100 | | | 6 | | ÀCES EXP | - IRT failed to inflate properly after deployment |
| * * | | | 45:24.6 MET | ELT DUDATION | | | 37 | | | IEF EXP. RME EXP. | (rendezvous canceled). |
| X | A A A A A A A A A A A A A A A A A A A | | 124.8 Seconds | <u>FLT DURATION</u> : 7:23:15:55 | | A | 11/2 | | | NIVIL LAI . | - Both SRB's lost one chute. |
| * 80 | | | .21.0 00001103 | 191:15:55 | | | 4 | | | ANCILLARY: | - WESTAR-IV and PALAPA-B failed to achieve desired |
| | | | | 171.10.00 | | 1 | - | | | IKT (DEPLOYED) GAS (5) | orbit due to PAM-D nozzle failure. (Both satellites were |
| | | | | <u>S/T</u> : 60:03:02:39 | *** | | | 1 | | IRT (DEPLOYED) GAS (5) STUDENT EXP | retrieved on STS 51-A). |
| | | | | 01/ 000 | 43 | | VL J | | | I(A.F.M.) | - LH SRM forward center field joint gas leak to |
| 1 100 | Town W | | | <u>OV-099</u> : 25:03:12:19 | Feb. 4, 19 | 84: McCa | andless | performed the | | SESA+ BEAM (BAY 2) MLR EXP | primary O-ring with erosion. |
| | urev | | | ZJ.UJ. 1Z. 17 | first unteth | ered exc | ursions | wearing the | | 4 CRYO TK SETS | - RH SRM gas leak and erosion to primary O-ring of nozzle-to-case joint. |
| | | | | DISTANCE: | Manned M | aneuver | ina Unit | , a rockět | | RMS 6 (S.N. 201) CANCELED SPAS | - LH SRB main chute failed to inflate. |
| CD CD | R Brand & | PLT Gibson | | 2,870,000 sm | propelled I | packpack | c. He fle | w 320 ft from | | DFPLOY (RMS | ET SAS Main Grate railed to littlate. |
| | | | | | Obiter, fur | her than | any pre | evious astronaut. | | PROBLEM) | |
| | | | | | | | | | | | |

| | | | | COL OITO | | | OITE | OOM | | X I | ŭ |
|-----------------|--|------------------------------|-----------------------------|--|--|----------------|---------------|--|------|---|--|
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
| | | (5) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (8) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | | | WINDS | ENG. S.N. | | | | | CARCO | |
| STS 41-C | OV-099 | CDR: | KSC 39A | EDW 17, LAKEBED (EDW 9, LKBD 5) | 104/104 | BI-012 | 28.45° | <u>DIRECT</u> | OI-2 | <u>CARGO</u> : 38266 lbs | KSC W/D: OPF 31, VAB 4, PAD 18 = 53 |
| (STS-13) | Flight 5 | Robert L. Crippen | 097:13:57:59.999Z | (EDW 9, LNDD 3) | (109) | | (7) | <u>INSERTION</u> | (3) | | LAUNCH POCTDONEMENT |
| | Challenger | (Flt 3) | 8:58:00 AM EST (P) | 5:38:07 AM PST | | MTR: | 07157 | | | CHARGEABLE: 33831 lbs | LAUNCH POSTPONEMENT: - 4/4/84 launch postponed 2 days to 4/6/84 to upgrade |
| | | (STS-1 & STS-7) | 8:58:00 AM EST (A) | Friday 2 | 100/104/ | HPM | START: | 252 NM | | | OMS pod TPS (STS 41-B problem during entry). 2-day |
| SEQ | 0.40 5050 | P38/R2/V1/M2 | Friday 2 | 4/13/84 (3) | 67/104/ | CASE: | -18.1° | DIRECT | | DEPLOYED: 21396 lbs | slip. |
| FLT # 11 | OMS PODS | PLT: | 4/6/84 (3) | VDANCE. | 65 | MWC | END | <u>INSERTION</u> | | | LAUNCH CODURC, None |
| | LPO3 - 1 | Francis R. Scobee | LALINGLUMINDOM | XRANGE: 381 NM | 4 0400 (0) | ET 40 | <u>END</u> : | 054 () (445 4 | | NON-DEPLOYED: 12394 lbs | LAUNCH SCRUBS: None. |
| KSC 11 | RP01 - 5 | P39/R34/M33 | LAUNCH WINDOW: | JOT WIN | 1 = 2109 (2) | ET-12 | +12.0° | 251.6 X 115.4 | | | LAUNCH DELAYS: None. |
| | FRC9-5 | M/S: | ~3.5 MINUTES | ORB DIR: DL 7 | 2 = 2020 (1) | LWT-5 | NAAV. | NM | | MIDDECK: 41 lbs | |
| <u>PAD</u> | | Terry J. Hart P40/R35/M34 | (PLANAR | | 3 = 2012 (5) | ET DDT | MAX: | DEORBIT | | | TAL WX: Dakar no go - low clouds. |
| 39A-11 | | | WINDOW/ET FOOTPRINT NEAR | <u>aim PT</u> : NOM | | ET RPT 246K | | 268 X | | RETURNED: 16870 lbs | FLIGHT DURATION & LANDING SITE CHANGES: |
| | Total Control | M/S: James D. van Hoften | HAWAII) | MLGTD: 1912 FT | | 1:22:15 | | 265 NM | | SHUTTLE | - Extended flight 1 day to replan use of RMS to grapple SMM after TPAD docking failure. |
| (S) | THE PARTY OF THE P | P41/R36/M35 | HAWAII) | 104:13:38:07Z | M 3 EOM | MET | | ZOO IVIVI | | ACCUMULATED | SMM after TPAD docking failure. |
| 13/ | | M/S: | DIC KCC | VEL: 220 KGS | IVI 3 LOIVI | IVIL I | | VELOCITY | | ACCUMULATED WEIGHTS: | - Extended flight 1 rev to land at EDW because of unacceptable weather (overcast) at KSC. |
| | Z Z | George D. Nelson | PLS - KSC SLS - EDW | 213 KEAS | WEIGHT: | ET BR/UP | | 25998 FPS | | IDEPLOYED: | - Total extension: 1 day+ 1 rev. |
| 0.474 | 25 | P42/R37/M36 | TAL - DAKAR | HDOT: -1.5 FPS | 197170 | 228K | | 23770113 | | 110994 lbs NON-DEPLOYED: | , and the second |
| | | 1 42/1037/10130 | TAL WX - ROTA | TD NORM 195: | 177170 | 1:22:45 | | <u>RANGE</u> | | 173350 lbs CARGO TOTAL: | FIRSTS: |
| Chin | | UNTETHERED EVA'S | AOA - EDW | 3505 FT | X CG: 1100.0 | MET | | 4090 NM | | <u>CARGO TOTAL</u> : 328452 lbs | - First rendezvous/satellite renair flight |
| PEN | + SCO | (MMU): | AOA • LDW AOA WX - NOR | | X 00. 1100.0 | IVILI | | 4070 WW | | | - First flight to use direct insertion First rendezvous/satellite repair flight First use of TPAD. Nelson used MMU to translate to |
| | | EV1=Nelson | AOA WA - NOR | NLGTD: 7167 FT | LANDING | FT | NAME OF BRIDE | | No. | PERFORMANCE | ISMM and attempted to dock using TPAD. TPAD falled |
| | | EV2=van Hoften | MAX Q = 635 | 104:13:38:23Z | <u> LY II VOII VO</u> | ET IMPACT | ALC: N | | | MARGINS (LBS): FPR: 5052 | to fire because a thermal insulation button prevented it from firing. |
| | | ZTZ Tan Honon | M = 1.03 | VEL: 144 KGS HDOT: -4.6 FPS | WEIGHT: | LAT: | | A Committee of the Comm | 1 | FUEL BIAS: 1038 | - First grapple of satellite using RMS |
| MCC FCR-2 | (7) | EVA1=2:59/3:05 | | 110014.0113 | 196976 | 18.90°S | | | | FUEL BIAS: 1038 FINAL TDDP: 995 RECON: -3322 | - First grapple of satellite using RMS. - First direct insertion (no OMS-1 burn). |
| MOOTORE | (,) | 4/8/84 - SS EVA #4 | SRB SEP: | BRK INIT: 110 KGS | | LONG: | | | 107 | | |
| FLIGHT DIRE | CTORS | SMM TPAD DOCK ATTEMPT | 2:05.57 MET | | X CG: 1101.6 | 149.9°W | = 100 | | | PRIMARY: | RENDEZVOUS 1 & 2: - To capture, repair, and release SMM. |
| Asc/Ent - G. E | | EVA2=7:07/6:30 | | AVE BRK DECEL: 8.4 FPS/S | | | | | 10 | LONG DURATION EXPOSURE | |
| Ld/O 1 - J. H. | Greene | 4/11/84- SS EVA #5 | MECO: | 8.4 FPS/S | | | | | X | FACILITY (LDEF) | EVENTS: |
| Orbit 2 - J. T. | Cox | SMM REPAIR AND RELEASE | 8:30.76 MET | WHEELS STOP: | | | | A CONTRACTOR | | (DEPLOYED) ' | Nelson held onto solar panel during MMU ops to attempt to slow SMM rotation. |
| Planning - B. | R. Stone | | | 104:13:38:55Z | | | | | | SMRM/FSS | - Re-rendezvous with SMM on 5th day & RMS grapple of |
| MOD - E. F. K | (ranz | FREE FLYER EVA'S | ET SEP: | 10628 FT | | | | | | SMRM/FSS (RETRIEVED, REPAIRED & | - Re-rendezvous with SMM on 5th day & RMS grapple of SMM. Repair and redeploy of SMM on 6th day by van |
| | | #3 AND #4 | 8:48.9 MET | DOLLOUT: | | | | Deployed by | | RELEASED) | Hoften & Nelson. |
| | | | | ROLLOUT: 8716 FT | | | | amples for lo | | ĺ | - RMS used to survery OMS pods and monitor water dumps to ensure no ice chunks on nozzles. |
| -/1/ | | 2000 | <u>OMS-1</u> : | 48 SEC | | | | NASA LRC | . To | MMU (2) MMU/EMU | · |
| | | 300 | NONE | | be retriev | ed by ST | S-32 in1 | 990. | | MFR PLATFORM | ET TRACKING DTO 331/318 NEAR HAWAII |
| | | | | WINDS: | | | | | | BAY 10 CINEMA 360 I-MAX CAMERA | - ET Reentry (tumble)-KPTC RADAR poor coverage, MOTIF unusable, CAST GLANCE - LH2 rupture |
| 11/200 | | | OMS-2: | 2 H, O X KNOTS OFFICIAL: 0H, 0X | | | 03383 | - Colombia | | I-MAX CAMERA | 264-254 Kft debris large DV, "violent rupture." |
| Aug. | | | 42:54 MET | OTTICIAL. OTT, OX | | | 1000 C | | | RME EXPERIMENT | , i |
| | | | 95.1 Seconds | DENS ALT: 1000 FT | 100 | 400 | | | | ANCILLARY: | SIGNIFICANT ANOMALIES: |
| 30 | | | | | | 1 | - | | | STUDENT | - RH SRB main parachute failure. - WCS fan SEP 1 low airflow. |
| # 40g | OI. | | | FLT DURATION: | | | | | | EXPERIMENTS | - WCS fan SEP 2 failed. |
| REPAIR | | R-SA | | 6:23:40:07 167:40:07 | | 100 | | ACK. | | ACIP | - Brake damage similar to STS- 7 on left & right sides. |
| CO | * AGE + | | | 107.40.07 | | 1.00 | 0 | | | 4 CRYO TANK | - Ku-band Rndz Radar failed self test & lost lock. - RH SRB one chute failed to inflate. |
| | CO. | # ACE + RETAIN | | S/T: 67:02:42:46 | | | III/III | 190 4 | | SETS | - RH SRM gas leak and erosion to primary O-ring |
| | - | SATELIN | | | | | | | 1 | RMS 7 (S.N. 302) | (blowby) nozzle-to-case joint. |
| 410.07.02 | 62 Crown D | LT Scobee, | | <u>OV-099</u> : 32:02:52:26 | The state of the s | 5-18 Bu | Allen I | 1 (17) | | Used for LDEF de- | (blowby) nozzle-to-case joint. RADIATORS DEPLOYED #8 (for one sleep period) |
| | | | | 32:02:32:26 | | | - | | | picy, Sivikivi capitile, berth, and denlov | KADIATOKS DEPLOTED #8 (101 ONE SIEEP PERIOD) |
| | | en/MS, Hart/MS, & | | DISTANCE: | STS | 41C-38-1852 | 2 SSM R | epair FVA | | berth, and deploy and water nozzle and OMS pod survey | |
| CDR Cripp | pen. | | | <u>DISTANCE</u> : 2,880,000 sm | 310 | 1 10 100 | 2010 | - p = | | and Oivis pod survey | |
| | | | 1 | The second secon | | | | | | | The state of the s |

| | | | | SPA | SE SHUT | | 1991 | ON2 | | /IAI | K Y | Page 2-12 - 515 41-DR |
|--------------------|--|-------------------------------|---------------------|----------------------------------|-------------------------------------|--|----------------|-----------|----------------------------|-------------|--|---|
| | | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
| EL T | ODDITED | | (6) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | ' | ORBIT | E0147 | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | | . , | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | INIC | LIA/LID | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | | E, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, | THROTTLE PROFILE | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | | CLVNO | | WINDS | ENG. S.N. | | | | 01.4 | 04000 | |
| STS 41-DR | OV-103 | CDR: | | KSC 39A | EDW 17, LAKEBED (EDW 10, LKBD 6) | 104/104 | BI-011 | | STANDARD_ | OI-4 (1) | <u>CARGO</u> : 47516 lbs | KSC W/D: |
| (STS-14) | Flight 1 | Henry W. I | | 243:12:41:50Z | (LDW 10, LKDD 0) | 109 | CDM | (8) | <u>INSERTION</u> | (1) | | OPF 123 (2), VAB 15 (3), PAD 72 (2) = 210 |
| | Discovery | (Flt 2 - ST: P/43/R8/V | | 8:35:00 AM EDT (P) | 6:37:54 AM PDT | 100/104/ | SRM: HPM | | INSERTION | | CHARGEABLE: 41382 lbs | LAUNCH POSTPONEMENT: |
| SEQ | | PI43/R8/V PLT: | 3/1018 | 8:41:50 AM EDT (A) Thursday 3 | Wednesday 1 | 84/65/ | HPIVI | | ALTITUDE: | | | - 6/22/84 launch postponed 3 days to 6/25/84 because of |
| FLT # 12 | | Michael L. | Coats | 8/30/84 (2) | 9/5/84 (2) | 104/65 | CASE: | | 160 NM | | DEPLOYED: 30086 lbs | debonded engine shield during FRF. |
| KSC 12 | OMS PODS | P44/R38/N | | 0/00/01 (2) | XRANGE: 474 NM | 10 1/00 | LWC | | 100 14111 | | | |
| K3C 12 | LPO3 - 2 | <u>M/S</u> : | | LAUNCH WINDOW: | 000 010 01 0 | 1 = 2109 (3) | | | 160.8 X | | NON-DEPLOYED: 10122 lbs | LAUNCH SCRUBS/PAD ABORT #1: |
| PAD | RPO3 - 1 | Steven A. | | 14 minutes thermal | ORB DIR: DL 8 | 2 = 2018 (2) | LWT-6 | | 160.8 NM | | | - 6/25/84 launch scrubbed at T-20 minutes because GPC |
| 39A-12 | FRC3 - 1 | P45/R39/N | Л38 | constraint | AIM PT: NOM | 3 = 2021 (1) | ET-13 | | DOOT ONG O | | MIDDECK: 1174 lbs | 5 (BFS) exhibited two parity errors at T-32 minutes. Rescheduled launch for 6/26/84. |
| | | <u>M/S</u> : | | SBS-D on 5A & | | | ET DDT | | POST OMS-2 161.63 X | | | - 6/26/84 launch aborted at T-4 seconds when SSME |
| | | Richard m | | TELSTAR 34A EHS | MLGTD: 2510 FT 249:13:37:54Z | | ET RPT 245K | | 160.95 NM | | RETURNED: 17436 lbs | #3 Main Fuel Valve failed the valve position check. |
| | | M/S: | //39 | cutout | VEL: 216 KGS | | 45:45 | | 100.75 NIVI | | | (PAD abort #1.) |
| | | Judith A. F | Resnik | PLS - EDW | 200 KEAS | | MET | | SBS DEPLOY | | SHUTTLE ACCUMULATED | - Rolled back to VAB and re-manifested, combining |
| | | P47/R41/F | | SLS - KSC | HDOT: -1.8 FPS | M 3 EOM | | | 161.43 NM | | WEIGHTS: | STS 41-D and STS 41-F P/L's. SSME 2021 replaced |
| | | <u>P/S</u> : | | TAL - DAKAR | TD NORM 195: | WEIGHT: | ETBR/UP | | (REV 6) | | DEPLOYED: | 2017. Launch slip of 63 days 8/29/84 launch scrubbed because MEC would not |
| | | Charles W | 'alker | (Selected) | 2960 FT | 202317 | 197K | | | | 141080 lbs | process certain critical events commands. Implemented |
| 450 | LD CO | (MDAC) | | TAL WX - MORON | NI CTD: 4712 ET | | 46:57 | | SYNCOM DEDLOY | | NON-DEPLOYED: 184646 lbs | a software patch to assure all 3 SRB fire commands are |
| Site | To | P48/R42/N | Л40 | AOA WW NOD | NLGTD: 6713 FT 249:13:38:08Z | X CG: 1090.7 | MET | | <u>DEPLOY</u> 170.48 NM | | CARGO TOTAL: | issued in proper order. 69-day total slip. |
| | 1 + | MCC FCR-1 | (5) | AOA WX - NOR EOM - EDW | VEL: 170 KGS | LANDING | СТ | | (REV 17) | | 375968 lbs | LAURIOUEELAVO |
| | 7 3 | | | LOW - LDW | HDOT: -5.6 FPS | LANDING | ET IMPACT | | (112 17) | | <u>PERFORMANCE</u> | LAUNCH DELAYS: - 6 M50 S delay at T-9 because of KSC GLS problems |
| E | | FLIGHT DIR | | <u>MAX Q</u> = 611 | BRK INIT: 107 KGS | WEIGHT: | LAT: | | <u>TELSTAR</u> | | MARGINS (LBS): FPR: 4987 | and two private planes in launch danger area. |
| 12 (00 | | Asc/Ent - G. Ld/O 1 - B. F | E. Coen | M = 1.26 | | 201675 | 28.3°S | | <u>DEPLOY</u> | | FUEL BIAS: 1341 | and two private planes in launon danger area. |
| 10.70 | Contra | Orbit 2 - J. T | | | AVE BRK DECEL: 5.6 FPS/S | | LONG: | | 174.94 NM | | FINAL TDDP:-1611 | FLIGHT DURATION CHANGES: None. |
| 400 | EY REST | Plng - A. L. E | Briscoe | SRB SEP: | | X CG: 1091.7 | 80.0°E | | (REV 34) | | RECON: -1564 | T |
| 5650 | | MOD - F. F. | Kranz | 2:04.12 MET | WHEELS STOP: 249:13:38:54Z | | | | DEORBIT | | PRIMARY: | TAL WX: DAKAR & MORON go. |
| | 1 | | | MECO: | 249:13:38:54Z 12785 FT | | | | 159 X 157 NM | | SBS-D/PAM-D (DEPLOYED) | FIRSTS: |
| | 1 | 1 | | 8:35.19 MET | | 41D-37-0 | 50 To | leter | VELOCITY | | TELESTAR 3-C/ | - First flight of Discovery |
| | | - | | | ROLLOUT: 10270 FT | last of thr | | | 25776 FPS | | PAM-D | - First flight to deploy 3 payloads. |
| - 0 | 63 | | 41D-12-034: | <u>ET SEP</u> : | 60 SEC | deployed | | 1103 | RANGE | | (DEPLOYED) SYNCOM-IV-2 | - First flight with commercial company P/S. |
| | T-BOA | | Crew | 8:53 MET | | aopioyea | | | 4112 NM | | (DEPLOYED) | SIGNIFICANT ANOMALIES: |
| THE PARTY NAMED IN | | THE REAL PROPERTY. | members | OMS 1: | <u>WINDS</u> : O H/T, O X KNOTS | The state of the s | III) | | | | OAST-1/MPESS: | - CRT-2 failed (IFM replaced DU-2 with DU-4) |
| - Contract | VOID CONTRACTOR | | (cc from ctr) | <u>OMS-1</u> : 10:36.9 MET | OFFICIAL: 2H, 2L | | | | | | SOLAR ARRAY | - Supply/waste water nozzle iced. (12 inches in diameter |
| | | NO V | CDR/ | 159.4 Seconds | | 100 | 0.10 | A THE | | | EXPERIMENT CFES (MIDDECK) | by 27 inches tapered to point). |
| 1-15 | | | Hartsfield, | | DENS ALT: 3400 FT | 2 x = 1 2 | | | | | IMAX 70MM | - Ice from supply water nozzle removed using RMS impact . |
| (le | | 3 | PLT/Coats, | OMS-2: | FLT DURATION: | CONTRACT. | | | | | CAMERA | Unable to dump waste water for remainder of flight O ₂ leak (30 lbs/hr). |
| | The same of the sa | | Morriamoji | 44:52.2 MET | 6:00:56:04 | | | 1 | | | RME CLOUDS | - Fuel cell performance monitor failed. |
| | | 12 | MS/Resnik, | 126.3 Seconds | 144:56:04 | | | | | | STUDENT EXP. | - Vehicle pulled to right after NLGTD. Schrader valve |
| | | 301 | PS/Walker, | | <u>S/T</u> : 73:03:38:50 | | | 11 | | | SSIP-FSA EXP. | leaking GN2 caused compressed strut. |
| | | | & | | 01/102 | CONTRACTOR OF THE | 250 | | | | 4 CRYO TANK | - S-band Quad antenna (ULF) (switch was R & R'ed |
| | 3 | | MS/Mulane | | OV-103: 6:00:56:04 | 100 | | 1992 | | | SETS | postflight) Five microswitch anomalies in RCS & OMS. |
| | | S) | | | | The Park of | | | 0 | | RMS 8 (S.N. 301) | - RH SRM forward field joint erosion. |
| | A | 9 . | | | DISTANCE: 2,210,000 sm | 1 | | Mary Mary | | | Used for PKM burn viewing and water | - LH SRM gas leak and erosion to primary O-ring of |
| | | | | | 2,210,000 SM | | ZOSA Antily | 1 000 | CEL | No. | dump nozzle survey | nozzle-to-case joint (blowby). |
| | | 1000 | | | | A STATE OF THE PARTY OF THE PAR | | | 110 | - | and ice removal | |

| | | | SPA | ACE SHUT | LLTE V | IISSI | ONS | SUMN | / IAF | RY | Page 2-13 - STS 41-G |
|--|--|---------------------------------------|--------------------------------|-------------------------------|----------------------|------------------------|--------|-------------------------------|--------------|--|---|
| | | CREW | LAUNCHICITE | LANDING SITE/ | SSME-TL | CDD | , | ODDIT | | DAVILOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (7) | LAUNCH SITE, LIFTOFF TIME, | RUNWAY, CROSSRANGE | NOM-ABORT EMERG | SRB RSRM | (| ORBIT | FSW | PAYLOAD WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | ORDITER | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | 1011 | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| CTC 44 C | OV-099 | CDR: | KSC 39A | WINDS KSC 33 | ENG. S.N. 100/104 | A / 2 / / A | 57.08° | STANDARD | OI-4 | <u>CARGO</u> : | <u>KSC W/D</u> : OPF 53, VAB 5, PAD 22 = 80 |
| STS 41-G (STS-17) | Flight 6 | Robert L. Crippen | 279:11:03:00Z | (KSC 2) | 100/104 | A63/64 117-84 | (2) | INSERTION | (2) | 23465 lbs | <u>KSC W/D</u> : OPF 53, VAB 5, PAD 22 = 80 |
| (313-17) | Challenger | (Flt 4 - STS-1, STS-7 & STS 41-C) | 7:03:00 AM EDT (P) | 12:26:38 PM EDT | | BI-013 | (=) | <u>toEttt1011</u> | (=) | CHARGEABLE: | LAUNCH POSTPONEMENT: |
| SEQ | | P49/R2/V1/M2 | 7:03:00 AM EDT (A) | Saturday 4 | 100/92/ | | | INSERTION | | 17592 lbs | - 10/1/84 launch postponed 4 days to 10/5/84 to replace |
| FLT # 13 | | PLT: Jon A. McBride | Friday 3 10/5/84 (1) | 10/13/84 (1) | 65/100/65 | MTR: HPM | | <u>ALTITUDE</u> : | | DEBLOXED: | SSME #2012 with #2021 from OV-103 in slot #3. Engine 2012 had non-flight HPOTP and HPFTP. 4-day slip. |
| KSC 13 | OMS PODS | P50/R43/M41 | 10/5/64 (1) | XRANGE: 614 NM | 1 = 2023 (1) | I IF IVI | | POST OMS-2 | | DEPLOYED: 4949 lbs | 2012 Hau Hon-Hight FIFOTE and FIFT FE. 4-day Slip. |
| K3C 13 | LPO1 - 5 | M/S: Sally K. Ride | LAUNCH WINDOW: | ORB DIR: DR 3 | 2 = 2020 (2) | CASE: | | 191.74 X | | NON-DEPLOYED: | LAUNCH SCRUBS: None. |
| <u>PAD</u> | RPO1 - 6 FRC9 - 6 | (Flt 2 - STS-7) | 2 hours | | 3 = 2021 (2) | LWC | | 189.06 NM | | 11986 lbs | LAUNCH DELAYS, None |
| 39A-13 | FRC9 - 0 | P51/R19/V6/F1 M/S: | (EOM - LANDING KSC REV 7) | AIM PT: CLOSE IN | | 115 FT | | <u>ERBS</u> | | MIDDECK: | LAUNCH DELAYS: None. |
| | | Kathryn D. Sullivan | | MLGTD: 962 FT | | CHUTES | | DEPLOY | | 657 lbs | FLIGHT DURATION CHANGES: None. |
| - | | P52/R44/F3 M/S: | PLS - KSC | 287:16:26:38Z VEL: 209 KGS | M 3 EOM | ON SRB'S | | 190 NM | | RETURNED: | TAL MAY 77A |
| 4222 | | David C. Leestma | AOA - NOR AOA WX-NOR | 208 KEAS | WEIGHT: | LWT-8 | | DEORBIT | | 18484.8 lbs | TAL WX: ZZA no go - winds, Moron go. |
| | | P53/R45/M42 <u>P/S</u> : | TAL-ZARAGOZA | HDOT: -0.5 FPS | 202829 | | | 121 X | | SHUTTLE | FIRSTS: |
| | | Paul D. Scully-Power | TAL WX-MORON | TD NORM 195: | | ET-15 | | 118 NM | | ACCUMULATED WEIGHTS: | - First flight with seven crewmembers. |
| | | (Civilian - Navy) P54/R46/M43 | (Selected) EMERGENCY | 2265 FT | X CG: 1083.7 | ET BR/UP | | VELOCITY | | DEPLOYED: 146029 lbs | - First EVA by a female astronaut. - First use of PSA. |
| | | <u>P/S</u> : | COLOGNE-BONN | NLGTD: 5505 FT | LANDING | 216K | | 25684 FPS | | NON-DEPLOYED: | - First Flight with 360 degree saddle brakes. |
| The same of the sa | | Mark Garneau (Canadian) | AIRPORT | 287:16:26:47Z VEL: 162 KGS | | 1:01:00 | | | | 197289 lbs | - First flight with wing moment ties. |
| | | P55/R47/M44 | MAX Q = 716 | HDOT: -3 FPS | WEIGHT: 202266 | MET | | <u>RANGE</u> 4321 NM | | CARGO TOTAL: 399433 lbs | - First transfer of hydrazine in space. |
| MCC FCR-2 | (8) | EMU/TETHERED EVA: | M = 1.42 | BRK INIT: 113 KGS | | ET | | 4321 IVIVI | | PERFORMANCE | EVENTS: |
| FLIGHT DIRE | CTORS | EV1=Leestma | | | X CG: 1084.8 | <u>IMPACT</u> | | | | MARGINS (LBS): | - Used RMS to latch SIR-B antenna. |
| Ascent - G. E. O 1/Ent - T. C | Coen | EV2=Sullivan EVA1=3:29/3:27 | <u>SRB SEP</u> : 2:04.5 MET | AVE BRK DECEL: 6.8 FPS/S | | <u>LAT</u> : 57.1°S | | | | FPR: 4594 FUEL BIAS: 1152 | - Solar heating used to free ERBS solar array when -Y solar array stuck during deploy attempt. MS2 tried deploy using |
| Ld/O 2 - J. T. | Cox | 10/11/84 - SS EVA #6 DEMO ON ORBIT | 2.04.5 IVIL I | WHEELS STOP: | | LONG: | | | | FINAL TDDP: 2194 | SSP appendage arm and deploy switches, to's functioned |
| Plng - G. A. P MOD - E. F. K | | REFUELING SYSTEM | MECO: | 287:16:27:32Z | | 150.0°E | | | | RECON: 3375 | nominally but array did not deploy. Could not shake array |
| MOD - E. F. K | IIdIIZ | UNSCHEDULED KU-BAND ANTENNA STOW | 8:50.34 MET | 11527 FT | | | | | | EARTH RADIATION BUDGET | loose using RMS back-drive procedure. ERBS was positioned to direct sun on array deploy mechanism. Array |
| | | RO-BAND ANTENNA STOW | ET SEP: | ROLLOUT: | THE | - | U.1 | | 1 | SATELLITE (ERBS) | deployed approximately 15 minutes later. |
| | | Leestma, left, & | 9:08.41 MET | 10527 FT 54 SEC | | | | | | DEPLOYED ` OSTA-3 (SIR-B) | . , , |
| Sullivan, 1 | st U.S. won | man to conduct EVA. | OMS-1: | | | | 1996 | | | MAPS, FÎLE | SIGNIFICANT ANOMALIES: - Found TPS screed problem postflight. Tile waterproofing |
| E TEXAS I O | | | 10:50.4 MET | WINDS: 8 H, O X KNOTS | | | | | Sec. | LFC-MPESS ORS | caused screed deterioration requiring approx 4000 tiles to |
| The state of the s | 1 | 14/2 | 130.6 Seconds | · · | | | | | 3 | IMAX, RME | be replaced. Schedule impacted and OV-103 replaced |
| | | | OMS-2: | OFFICIAL: 8H, 0X | 3 | | 113 | PUR FU | =) | CANEX (Canadian) APE, TLD | OV-099 on STS 51-A FES shutdown by both controllers, probably icing in FES |
| 29/90 | | | 60:30.4 MET | DENS ALT: 1100 FT | | | | 18 | | GAS (8) | CORE. |
| New ST | NAME OF THE OWNER OWNER OF THE OWNER OWNER OF THE OWNER OWNE | | 144.6 Seconds | FLT DURATION: | | | | | | G038, G032, G518, G013, G007, G469, | - DEU 2 Failed. |
| | | | | 8:05:23:38 197:23:38 | The sales | | | MASA | | G074 | - TPS damage on ROMS pod, approx 40-inch strip of FRSI peeled off. |
| 1000 | No View | | | | • | - 002W | | | | 4 CRYO TANK | - Ku-Band antenna gimbal failure (beta angle motor short). |
| 對人 | | CONTRACT OF FREE | | <u>S/T</u> : 81:09:02:28 | | | | R Crippen | D | SETS | EVA IFM to stow antenna. |
| | THE STATE OF | | | OV-099: 40:08:16:04 | | | | w l.to.r. are: I n/MS, and | PLI | RMS 9 (S.N. 302) | - R & R brakes post-flight R & R MLG tires (damaged by rough runway). |
| | 3 | | | 40:08:16:04 | | | | v (left) Scully | /- | Used for ERBS deploy, TPS survey, | - K & K IVILO (IIES (ualilaged by fought unway). |
| | Marie Land | | | DISTANCE: | | | | pher and (rig | | water nozzle survey, SIR-B antenna | |
| | No. of the last | AND THE PARTY OF | | 3,400,000 sm | Garneau/ | | | | | latching assist | |
| | | | | • | * | | | | | | - |

| | | | | JE SHUT | | | 0110 | | ,,, | * I | |
|-------------------------------|-----------|---|----------------------------------|------------------------------------|----------------------|------------------------|---------|---------------------------|-------|---|---|
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
| | 0001750 | (5) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | (| ORBIT | 50111 | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (*/ | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, WINDS | PROFILE ENG. S.N. | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| CTC E1 A | OV-103 | CDR: | KSC 39A | KSC 15 | 104/104 | BI-014 | 28.487° | STANDARD | OI-4 | CARGO: | KSC W/D: OPF 34, VAB 5, PAD 17 = 56 |
| STS 51-A (STS-19) | Flight 2 | Frederick H. Hauck | 313:12:15:00Z | (KSC 3) | 109 | 61-84 | (9) | INSERTION | (3) | <u>CARGO</u> : 45306 lbs | <u>KSC W/D</u> . OTT 54, VAD 5, I AD 17 - 30 |
| (313-19) | Discovery | (Flt 2 - STS-7) | 7.45.00 ALA EOT (D) | | 107 | 01 04 | (7) | INSERTION | (5) | PAYLOAD | VEHICLE CHANGE: |
| SEQ | 2.00070.9 | P56/R17/V7/M17 | T 45 00 444 507 (4) | 6:59:56 AM EST Friday 3 | 100/89/ | SRM: | | INSERTION | | PAYLOAD CHARGEABLE: | - OV-103 replaced OV-099 (TPS screed deterioration |
| FLT # 14 | | PLT: | Thursday 4 | 11/16/84 (3) | 67/104/ | HPM | | ALTITUDE: | | 38003 lbs | cased by waterproofing). |
| | | David M. Walker P57/R48/M45 | 11/8/84 (4) | ` ' | 65 | LWC | | | | DEPLOYED: 22764 lbs | , , |
| KSC 14 | OMS PODS | M/S: | | XRANGE: 486 NM | | | | POST OMS-2 | | | LAUNCH POSTPONEMENT: None. |
| | LPO3 - 3 | Joseph P. Allen | LAUNCH WINDOW: | ORB DIR: DL9 | 1 = 2109 (4) | 136 FT | | 161.22 X | | NON-DEPLOYED: 15052 lbs | |
| <u>PAD</u> | RPO3 - 2 | (Flt 2 - STS-5) | 18 Minutes | OKD DIK. DL7 | 2 = 2018 (3) | Chutes | | 151.17 NM | | | LAUNCH SCRUBS: |
| S84-40082 | FRC3 - 2 | P58/R12/V8/M12 | PLANAR WINDOW | <u>AIM PT</u> : CLOSE IN | 3 = 2012 (6) | LWTO | | TELECAT | | MIDDECK: 187 lbs | - 11/7/84 launch scrubbed because winds aloft exceeded |
| (August | | M/S: Anna L. Fisher | (MAX YAW STEERING MPS | MLCTD, 2724 FT | | LWT-9 | | TELESAT DEPLOY | | | Orbiter structural limits (excessive wind shear) - 1-day slip. |
| | | P59/R49/F4 | LIMIT 1000 LBS | MLGTD: 2724 FT 321:11:59:56Z | M 3 EOM | ET-16 | | 163.48 NM | | RETRIEVED: 2381 lbs | - 1-uay Siip. |
| LEH FISH | GARDA | <u>M/S</u> : | FOR RENDEZVOUS) | VEL: 194 KGS | IVI 3 LOIVI | L1-10 | | 103.40 MM | | | LAUNCH DELAYS: None. |
| 1 | - 02 | Dale A. Gardner | I OK KENDEZ VOOO, | 192 KEAS | WEIGHT: | ET RPT | | SYNCOM | | RETURNED: 24883 lbs | ENGNOTI DELITTO. NOTIC. |
| | | (Flt 2 - STS-8) | PLS - KSC | HDOT: -1.0 FPS | 207983 | 226K | | DEPLOY | | | TAL WX: |
| | | P60/R23/V9/M22 | TAL - DAKAR | TD NORM 195: | | 47:06 | | 168.14 NM | | SHUTTLE ACCUMULATED WEIGHTS: | - Dakar GO, Moron NO GO - low clouds. |
| HALICK | WALKER | UNTETHERED EVA'S | (Selected) | 2454 FT | X CG: 1081.4 | MET | | | | WEIGHTS: | |
| | | (MMU): | TAL WX - MORON | NII OTD /200 FT | | | | <u>PALAPA</u> | | 11)FPI()YFI). | FLIGHT DURATION CHANGES: None. |
| MCC FCR-1 (| (6) | EV1=Allen | AOA - EDW | NLGTD: 6380 FT 321:12:00:09Z | <u>LANDING</u> | ET IMPACT | | RETRIEVE | | 168793 lbs NON-DEPLOYED: | |
| | | EV2=Gardner | AOA WX-NOR,KSC | VEL: 160 KGS | WEIGHT | IMPACT | | 194.44 NM | | 212528 lbs | FIRSTS: |
| FLIGHT DIRE Ascent - J. H. | | EVA1-6:13 | MAYO (F1 | HDOT: -4.6 FPS | WEIGHT: 207506 | <u>LAT</u> : 27.7°S | | WESTAD | | 212528 lbs CARGO TOTAL: 444739 lbs | - First retrieval and return of satellites. PALAPA-B AND |
| Ld/O 1 - L. S. | | 11/12/84 - SS EVA #7 | $\frac{MAX \ O}{M = 1.10} = 651$ | BRK INIT: 142 KGS | 207300 | LONG: | | <u>WESTAR</u> RETRIEVE | | PERFORMANCE | WESTAR-IV were deployed on STS 41-B but PAM Upper Stages failed. |
| Orbit 2 - B. R. | Stone | EVA2-6:01 | 101 - 1.10 | DKK IIVIT. 142 KGS | X CG: 1082.6 | 82.0°E | | 189.55 NM | | MARGINS (LBS): | - EVA crewmen captured spacecrafts using MMU/Stinger |
| Plng - W. D. R | Reeves | 11/14/84 - SS EVA #8 CAPTURE AND STOW OF | SRB SEP: | AVE BRK DECEL: 6.5 FPS/S | 7. 00. 1002.0 | 02.0 L | | 107.00 14101 | | MARGINS (LBS): FPR: 4633 FUEL BIAS: 1566 FINAL TDDP: 281 RECON: 1003 | and stowed in payload bay. |
| Entry - T. C. La | | PALAPA-B & WESTAR-IV | 2:05.72 MET | 6.5 FPS/S | | | | DEORBIT | | FUEL BIAS: 1500 FINAL TDDP: 281 | |
| MOD - E. F. K | ranz | FREE FLYER EVA'S | | WHEELS STOP: | | | | 191 X | | RECON: 1003 | RENDEZVOUS 3 & 4: |
| | | #5 & #6 | MECO: | <u>WHEELS STOP</u> : 321:12:00:54Z | | | | 188 NM | | SYNCOM IV-1 (DEPLOYED) | - To capture and return PALAPA & WESTAR. |
| | | | 8:33.16 MET | 12178 FT | | | | | | (DEPLOYED) | |
| ok c | | | | ROLLOUT: | | | | <u>VELOCITY</u> | | TELESAT-H/ ANIK-D2/PAM-D | SIGNIFICANT ANOMALIES: |
| | | | ET SEP: | 9461FT | 51A-104-0 | 046: Gar | dner | 25870 FPS | | ANIK-D2/PAM-D (DEPLOYED) | - APU 2 water spray valve system A failed. |
| WHITE SAN | 3 | | 8:51.29 MET | 58 SEC | donned MN | | | RANGE | | 1 | - CRT 4 failed. - RCS F4R fuel leak. |
| THE THE THE | | | OMS-1: | WINDC. | to Westar \ | | | 4141 NM | | PALAPA-B2- (RETRIEVED & | - Both left side EMU helmet lights failed (Bad Batteries). |
| * + + E | | | 10:33.3 MET | WINDS: 4 H, O X KNOTS | satellite ret | | | 7171100 | | RETURNED) | - Arriflex 16mm camera failed (IFM bypassed failed |
| | 0 | | 150.7 Seconds | OFFICIAL: 2T, 1R | and Allen, | for return | ı to | | | WESTAR-IV - | microswitch). |
| | | | | DENO 11 T 100 FT | Earth. | | | | | WESTAR-IV - (RETRIEVED & | - FWD RCS Manifold 3 fuel and oxidizer Iso valves lost |
| | A A | | OMS-2: | DENS ALT: -100 FT | | | | | | RETURNED) | open indications. |
| | | | 44:43 MET | FLT DURATION: | | | | | | RME | - LRCS Sys B Fuel tank Iso Valve for manifold 3/4/5 lost |
| | | | 114.8 Seconds | 7:23:44:56 | | | | | | DMOS-3M EXP. MMU (2), EMU (3) | open indication. |
| me | | | | 191:44:56 | S. Tell | mm | or 1 | | | | - PLB blankets and metal discolored. |
| | | | | S/T: 89:08:47:24 | - F | 12 | S Pupi | | | 4 CRYO TK SETS | - Brake hydraulic pressure increased when Iso valves opened at 200K (Iso valve leak). |
| | | | | | | 1 | Who ! | | 1 | RMS 10 (S.N. 301) | opened at 200K (ISO valve leak). |
| | | | | <u>OV-103</u> : 14:00:41:00 | | TO VE | | E Da | | WESTAR capture | IFM's - Arriflex camera repaired, EVA helmet light repaired |
| \$84-40082 | CDR Hauck | seated, PLT Walker, | | 14:00:41:00 | | | 1 | 200 | 10 | and berth, waste. | and DAP key changeout |
| | | 51-A mascot. Others on | | DISTANCE: | | 1 | 1 | | | water dump monitor, and SYNCOM and | , , , , g, , , , |
| | | Iner/MS, Fisher/MS & | | <u>DISTANCE</u> : 2,870,000 sm | | 1 | 1 | 1 | 7.5 | RMS 10 (S.N. 301) Used for PALAPA/ WESTAR capture and berth, waste water dump monitor, and SYNCOM and TELESAT PKM | |

Allen/MS.

| | | | JI A | SE SHUT | | 10010 | | JOWI | | <u> </u> | |
|---|--|--|---|---|---|--|-------------|--|-------------|---|--|
| FLT | ORBITER | CREW (5) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS 51-C (STS-20) SEQ FLT # 15 KSC 15 PAD 39A-15 | OV-103 Flight 3 Discovery OMS PODS LP03 - 4 RP03 - 3 FRC3 - 3 | CDR: Thomas. K. Mattingly (Flt 2 - STS-4) P61/R7/V10/M7 PLT: Loren J. Shriver P62/R50/M46 M/S: Ellison S. Onizuka P63/R51/M47 M/S: James F. Buchli P64/R52/M48 P/S: Gary E. Payton P65/R53/M49 | KSC 39A 24:19:50:00Z 2:50:00 PM EST Thursday 5 1/24/85 (1) PLS - KSC SLS - EDW TAL - DAKAR TAL ALT: Zaragoza (Selected) TAL WX - MORON | KSC 15 (KSC 4) 4:23:23 PM EST Sunday 2 1/27/85 (1) XRANGE: 380 NM ORB DIR: DL 10 AIM PT: CLOSE IN MLGTD: 2753 FT 27:21:23:23Z VEL: 179 KGS 185 KEAS HDOT: -1FPS NLGTD: 5752 FT 27:21:23:35Z VEL: 146 KGS HDOT: -3.9 FPS TD NORM 195: 1853 FT BRK INIT: 117 KGS AVE BRK DECEL: 8.9 FPS/S WHEELS STOP: 27:21:24:13Z | 100/92/ 65/104/ 65 1 = 2109 (5) 2 = 2018 (4) 3 = 2012 (7) M 3 EOM WEIGHT: X CG: LANDING WEIGHT: 197700 X CG: 1091.8 | BI-015 MTR: HPM CASE: LWC 115 FT Chutes LWT-7 ET-14 ET RPT 239K 46:11 MET ET BR/UP 227K 46:31 MET ET IMPACT LAT: 28.1°S LONG: 78.3°E | 28.45° (10) | <u>DEORBIT</u> 185 X 185 NM <u>VELOCITY</u> 25855 FPS <u>RANGE</u> 4144 NM | OI-4 (4) | DOD PERFORMANCE MARGINS (LBS): FPR: FUEL BIAS: FINAL TDDP: RECON: -1457 ARC SFMD TRE VISION FLUID SHIFT OCEANS OASIS-1 CLOUDS AFT-T IOCM RMS 11 (S.N. 301) Used to monitor IUS/SRM burn | KSC W/D: OPF 31, VAB 5, PAD 20 = 50 LAUNCH POSTPONEMENT: None. LAUNCH SCRUBS: - 1/23/85 launch was scrubbed prior to ET tanking due to cold weather with potential for acreage ice on ET. 1-day slip. LAUNCH DELAY: Launch delay caused by right I/B elevon not in expected position. TAL WX: - Dakar & Moron NO GO - haze. Zaragoza GO. FLIGHT DURATION CHANGES: Yes. SIGNIFICANT ANOMALIES: - Right inboard elevon CH4 secondary delta pressure force flight prelaunch (cleared when APU's to full pressure) IMU 1 and 3 excessive bias GHE leak in T-O umbilical FWD RCS dilemma during deorbit BFS did not proceed to MM104 after ET sep BFS deorbit ignition time was 8 seconds late TACAN 3 did not lock up RA2 erratic at high altitude TPS had long gouge under left wing. |
| S84-43 | | C Crew & Patch MCC FCR-2 (9) FLIGHT DIRECTORS Ascent - J. H. Greene Ld/Orb - T.W. Holloway Ping - C. W. Shaw Orb/Ent - T. C. Lacefield MOD - E. F. Kranz | | 10105 FT ROLLOUT: 7370 FT 50 SEC WINDS: 8H, 0 X KNOTS OFFICIAL: 8H, 1R DENS ALT: -100 FT FLT DURATION: 3:01:33:23 73:33:23 S/T: 92:10:20:47 OV-103: 17:02:14:23 DISTANCE: 1,242,566 sm | | | | Shriver give to Defense Shuri | | up from Midsion. | - RH SRM primary O-ring gas leak and erosion at center field joint (blowby) LH SRM forward field joint gas leak and erosion to primary O-ring (blowby). |

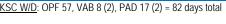
| FLT | ORBITER | | REW 77) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | |
|--------------------------|--------------------------------|--------------------------------|---------------|-------------------------------|--|---|---------------|-----|-------|------------|--------------------------------|----------------|
| NO. | | | NAMES VA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | |
| STS 51-E (STS-22) | OV-099 Flight Challenger | <u>CDR</u> : Ka | rol J. Bobko | | | | MTR: CASE: | | | OI-5 | <u>CARGO</u> : CHARGEABLE : | <u>K</u> : |
| SEQ FLT# | | <u>PLT</u> : Do Williams | nald E. | | | | STD ET-17 | | | | TDRS-B/IUS-2 | - |
| PAD | | <u>M/S</u> : M. | Rhea Seddon | | | | | | | | TELESAT-I/PAM-D FEE FPE | |
| | | <u>M/S</u> : | David Griggs | Bert Control of the Control | Marcon Transactor (100 April 100 Apr | 200000000000000000000000000000000000000 | E80. | | | J PANELSON | PPE | <u>L/</u> - |





(Left to right) Front row: Milt Heflin, Bill Reeves, Chuck Lewis, Al Pennington, & Cleon Lacefield.

Middle row: Jay Greene, Gary Coen, John Cox, & Harold Draughon. Back row: Randy Stone, Chuck Shaw, Tommy Holloway, Chuck Knarr, Larry Bourgeois, & Lee Briscoe.



MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

LAUNCH POSTPONEMENT:

- Launch rescheduled from 2/20/85 to 2/27/85 due to tile replacement caused by deteriorated screed on OV-099.
- Launch rescheduled to 3/3/85 due to LH2 primary seal leak (17" ET/Orbiter) but decision was made that secondary seal would hold.

LAUNCH SCRUBS

- Flight canceled on 3/7/85 due to a TDRS-B problem and TELESAT-I was remanifested on OV-103 STS-51D. (Challenger was destacked.)
- ROLLED BACK TO VAB, CHANGED PAYLOAD TO SPACELAB 3 FOR STS 51-B.
- THESE DATA ARE INCLUDED BECAUSE THE FLIGHT WAS SCRUBBED AFTER GOING THROUGH ALL OF THE FLIGHT REVIEWS, ETC.
- 17-INCH LH₂ PRIMARY SEAL REDESIGNED REDUCING WIDTH & DEPTH WITH STS 61-A AS FIRST FLIGHT.



Jeffrey A. Hoffman

Patrick Baudry

Jake Garn

(U.S. Senator from

(French)

FLIGHT DIRECTORS: Asc/Ent - T. C. Lacefield Orbit 1 - C. W. Shaw Ld/Orb 2 - B. R. Stone

<u>P/S</u>:

Utah)

| | | | | OL OITO | | | OITE | OOM | ,,, <u>,,</u> | X • | |
|-------------------------------|--------------------------|--|-------------------------------------|---------------------------------|------------------------------|------------------|--|---------------------------|---------------|---|---|
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
| | 0001750 | (7) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | 50111 | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (-7 | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, WINDS | PROFILE ENG. S.N. | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS 51-D | OV-103 | CDR: | KSC 39A | KSC 33 | 100/104 | BI-018 | 28.511° | DIRECT | OI-5 | CARGO: | KSC W/D: OPF 53, VAB 5, PAD 15 = 73 |
| | Flight 4 | Karol J. Bobko | 102:13:59:05Z | (KSC 5) | 109 | | (11) | INSERTION | (1) | <u>CARGO</u> : 35794 lbs | 100 WB |
| (STS-23) | Discovery | (Flt 2 - STS-6) | 8:04:00 AM EST (P) | 0.54.00.414.507 | 100/00/ | MTR: HPM | | DOOT ONE O | | PAYLOAD | LAUNCH POSTPONEMENTS: |
| SEQ | | P66/R14/V11/M14 PLT: | 8:59:05 AM EST (A) Friday 4 | 8:54:28 AM EST Friday 4 | 100/90/ 65/100/ | HPM | START: | POST OMS-2 249.0 X | | PAYLOAD CHARGEABLE: 28747 lbs | - 3/19/85 launch postponed 9 days to 3/28/85 to remanifest TELESAT-1 from STS 51-E. |
| FLT # 16 | | Donald E. Williams | 4/12/85 (4) | 4/19/85 (4) | 65 | CASE: | END: | 160.68 NM | | 28747 IDS | - 3/28/85 Jaunch postponed to 4/12/85 when PLBD was |
| | OMS PODS | P67/R54/M50 | ` ' | , , | | CASE: LWC | | | | DEPLOYED: | - 3/28/85 launch postponed to 4/12/85 when PLBD was damaged by OPF bucket (access platform dropped on |
| KSC 16 | LPO3 - 5 | M/S: | LAUNCH WINDOW: | XRANGE: 518 NM | 1 = 2109 (6) | 107 51 | MAX: | TELESAT DEDLOY | | 22,576 lbs | PLBD). 24-day slip. |
| | RPO3 - 4 FRC3 - 4 | M. Rhea Seddon P68/R55/F5 | 1 Hour, 11 Minutes (ANIK SS FAIL | ORB DIR: DL 11 | 2 = 2018 (5) 3 = 2012 (8) | 136 Ft Chutes | | DEPLOY 221.09 NM | | NON-DEPLOYED: | LAUNCH SCRUBS: None. |
| PAD | 1103-4 | M/S: | OPEN) | OKD DIK. DE 11 | 3 – 2012 (0) | Citates | | (REV 5) | | 5092 lbs | LAUNCH SCRUBS. None. |
| 39A-16 | | M/S: S. David Griggs | , | AIM PT: NOM | | ET-18 | | , , | | MIDDECK: 1079 lbs | LAUNCH DELAYS: |
| | | P69/R56/M5T | PLS - KSC SLS - EDW | MLGTD: 1639 FT | M 3 EOM | LWT-11 | | SYNCOM DEPLOY | | | - 55M5S delay - Ship in SRB recovery area. |
| | | M/S: Jeffrey A. Hoffman | TAL - DAKAR | 109:13:54:28Z | IVI 3 EUIVI | LVVI-II | | 213.16 NM | | RETURNED: 13248 lbs | TAL WX: Dakar no go - haze, Moron go. |
| | | P70/R57/M52 | TALWX - MORON | VEL: 209 KGS | WEIGHT: | ET RPT | | (REV 15) | | | The train to go maze, moren go. |
| | | <u>P/S</u> : | (Selected) | 200 KEAS | 198167 | ETDD/UD | | DEODDIT | | SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: | FLIGHT DURATION CHANGES: |
| to. WILLE | AMS | Jake Garn (U.S. Senator from Utah) | ÀOA - EDW AOA WX - NOR/KSC | HDOT: -3.2 FPS | X CG: 1092.7 | ET <u>BR/UP</u> | | DEORBIT 249 X | | WEIGHTS: | - Extended flight from 5 to 7 days for attempt to operate SYNCOM IV-3 arming switch using IFM "Fly Swatter" |
| 8 1 | | P71/R58/M53 | AOA WX - NOIVROC | TD NORM 195: | X CG. 1072.7 | <u>ET</u> | | 180 NM | | DEPLOYED: | (SYNCOM failed to maneuver to altitude because of |
| | | <u>P/S</u> : | <u>MAX Q</u> = 666 | 2089 FT | <u>LANDING</u> | IMPACT | | | | 191369 lbs NON-DEPLOYED: | defective mechanical arming switch. Crew |
| | WO LAN | Charles Walker | $M = 1.\overline{25}$ | NII CTD. 4202 FT | WEIGHT: | LAT: | | VELOCITY 25954 FPS | | 218699 lbs CARGO TOTAL: | re-rendezvoused with SYNCOM and snagged switch but switch was a single point failure and did not operate. |
| WALK | N + GRIGGS KER + GARN | (MDAC) (FII: 2 - STS 41-DR) | SRB SEP: | NLGTD: 4303 FT 109:13:54:36Z | 198014 | 20.24°N | | 20904 FPS | | 480533 lbs | - Landing at KSC was extended 1 rev because of KSC |
| | | (Flt 2 - STS 41-DR) P72/R42/V12/M40 | 2:06.84 MET | VEL: 182 KGS | | LONG: | | RANGE 4064 NM | | | weather. |
| | | EVA CREWMEN: | | HDOT: -5.9 FPS | X CG: 1094.3 | 149.37°W | | 4064 NM | | PERFORMANCE MARGINS (LBS): | - Extension: 2 days + 1 rev. |
| MCC FCR-2 | (10) | EV1= Hoffman | MECO: 8:51.96 MET | BRK INIT: 156 KGS | | | | | | FPR: 4732 FUEL BIAS: 883 FINAL TDDP: 1243 RECON: 1957 | RNDZ 5: To attempt to arm SYNCOM IV-3. |
| | ` ' | EV2= Griggs | 0.31.70 WE1 | DICK HVIT. 130 KGS | | | THE STATE OF THE S | | | FINAL TDDP: 1243 | NADE 3. TO attempt to ann 31WGOWTV-3. |
| FLIGHT DIRE Asc/Ent - T. C | | UNSCHEDULED EVA: | ET SEP: | AVE BRK DECEL: | | | | | | RECON: 1957 | ET TRACKING DTO 331/318: |
| Orbit 1 - J. T. | Cox | 4/16/85 - 3:10/3:07 | 9:10 MĒT | 8 FPS/S | | | TE | TO PAGE | | SYNCOM IV-3 | - ET Reentry (tumble) KPTC RADAR events detected at 245K and 232K, benign rupture. AWAC RADAR and |
| Ld/Orb 2 - B. | R. Stone | (ATTACHED "FLY SWATTER" | <u>OMS-1</u> : | WHEELS STOP: | | | | | | (DEPLOYED) | Doppler conflicting data. MOTIF unusable/cloud coverage. |
| Planning - J. I | | TO RMS.) SS EVA #9 | NONE | 109:12:55:31Z | | | The land | 1 | | TELESAT-I/ | CAST GLANCE no coverage/engine failure. |
| MOD - Ē. F. K | Kranz | SS Unscheduled EVA#1 | OMC 2. | 11937 FT | | Mad | | | | ANIK C-1/PAM-D (DEPLOYED) | |
| | | | OMS-2: 43.15 MET | ROLLOUT: | 4 | 43) | - | The second | | | SIGNIFICANT ANOMALIES: - Brake/tire problems resulted in programmatic decision to |
| | | | 143 Seconds | 10,430 FT | | A POR | | - | The same | GAS(2) CFES-[II, APE, PPE | land at EDW lakebed until Nose Wheel Steering is used |
| DI T M/illia | ame CDP | BobkoGriggs/MS Se | on Carne/PS | 63 SEC | 75 | unan . | 13 | | 9 - | SSIP(2) | during landing at FDW. |
| I LI VVIIII | allis CDR | - Stiggs/No St | ii. Gairis/FS | WINDS: | | | ***** | 10 | 7 | 2 - MINIATURE | - Cryo 02 tank 1 htr ctlr auto mode failed. - Right ET door latches A and B indicated off (Thermal |
| | Par. | A USM | | 3T,5R KNOTS | | | | | 1 | 2 - MINIATURE COPPER STATUES OF LIBERTY MADE FROM "SOL" FRAMEWORK | barrier pinned between door and sill). |
| | | | | OFFICIAL: 4T, 7R | | | 43: | 7 | | OF LIBERTY MADE FROM "SOL" | - Ku-band antenna motion erratic. |
| | - Can | | (A) | DENS ALT: 1100 FT | | 1 | US | | 2 | FRAMEWORK | - Hydraulic Sys 3 accum rapid pressure decay. - APU 3 shutdown load abnormal. |
| | | 3 | | DENS ALI. 1100 FT | | 5 | | | 0 | | - APO 3 SHUUOWH 10au abhornai. - Right MLG inboard tire burst. |
| | A COL | O TO THE REAL PROPERTY. | BE | FLT DURATION: | | 4 | | W. | 1 | SKIN CLAMP (12 LBS) | - Right MLG brakes damaged (locked up) |
| _ | | | | 6:23:55:23 | | A | The same of the sa | - B | 1 | 4 CRYO TANK | - Left OB elevon TPS damaged/skin burn. |
| 5 | | | | 167:55:23 | | | | 2 le | 1 | SETS | - Right RCS thruster R2U oxidizer leak. |
| | | | P | <u>S/T</u> : 99:10:16:10 | 10 8 | 0 15 | | | 1 | RMS 12 (S.N. 301) Used for flyswatter | IFM: Developed and used "flyswatter" to snag SYNCOM |
| | MAN R | | | | 51D-09-0 | 14: Eirot o | oitting m | ombor of | | Used for flyswatter | arm switch. |
| 0 | 38 | | | <u>OV-103</u> : 24:02:09:46 | | | | ember of S (left) & CD | D | snag of SYNCOM arm switch, PKM | |
| die | | | 9 11/23 | Z-1.UZ.U /.TU | | | | mic strip. Se | | monitor, ET door | |
| | | | S P | DISTANCE: | | | | Trudeau's | н. | survey, and water dump survey | |
| | | | per Honorox, Ital | 2,500,000 sm | Gain was | subject c | autnor | Trudeau s | | r y | |

creations prior to the mission.

Hoffman/MS --- Seddon/MS --- Walker/PS

| | | | SFA | PE SUOI | | | CIAO | | | \ I | · · |
|--|---|--|--|--|---|---|------------------------------|--|-------------|--------------------------------------|--|
| | | CREW (7) | LAUNCH SITE, | LANDING SITE/ RUNWAY, | SSME-TL NOM-ABORT | SRB | (| ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT NO. | ORBITER | TITLE, NAMES | LIFTOFF TIME, LANDING SITES, ABORT TIMES | CROSSRANGE LANDING TIMES FLT DURATION, | EMERG THROTTLE PROFILE | RSRM AND ET | INC | HA/HP | FSW | WEIGHTS, PAYLOADS/ EXPERIMENTS | (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| NO. STS 51-B (STS-24) SEQ FLT # 17 KSC 17 PAD 39A-17 | OV-099 Flight 7 Challenger Spacelab 3 SECOND SPACELAB FLIGHT LM (2) OMS PODS LPO1 - 6 RPO4 - 1 FRC9 - 7 | TITLE, NAMES & EVA'S CDR: Robert F. Overmyer (Fit 2 - STS-5) P73/R10/V13/M10 PLT: Frederick D. Gregory P74/R59/M54 M/S: Don L. Lind P75/R60/M55 M/S: Norman E. Thagard (Fit 2 - STS-7) P76/R20/V14/M19 M/S: William E. Thornton (Fit 2 - STS-8) P77/R24/V15/M23 P/S: Taylor Wang P78/R61/M56 P/S: Lodewijk Van den Berg P79/R62/M57 MCC FCR-1 (7) FLIGHT DIRECTORS: Asc/Ent - T. C. Lacefield Ld/O 1 - G. E. Coen O 2 - W. D. Reeves O 3 - G. A. Pennington MOD - E. F. Kranz I-Wang-van den Berg | LANDING SITES, | LANDING TIMES | THROTTLE PROFILE ENG. S.N. 104/104 109 100/94/ 65/104/ 103/72/ 65 1 = 2023 (2) 2 = 2020 (3) 3 = 2021 (3) M 3 EOM WEIGHT: 213795 X CG: 1084.1 LANDING WEIGHT: 213499 X CG: 1085.4 | BI-016 MTR: HPM CASE: LWC ET-17 LWT-10 ET RPT 220K 1:01:12 MET ET BR/UP 195K 1:01:42 MET ET IMPACT LAT: 57. 1°S LONG: 150.8°E | F Overnyation in ray between | STANDARD INSERTION INSERTION ALTITUDE: POST OMS-2 191.74 X 189.37 NM DEORBIT 192 X 189 NM VELOCITY 25857 FPS RANGE 4264 NM | OI-4 (5) | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| C | DR Overmye | er Thorton | 46.15 MET 147.5 Seconds | <u>DISTANCE</u> : 2,900,000 sm | clouds on and the ta | Earth. Il red ra | The blue ys are a | e are moonli e-green band urora. Brow inescence. | t | | |

| | | | SPA | CE SHU | | /II331 | ONS | | Fage 2-19 - 313 31-G | | |
|---|---|--|---|--|--|---|----------------------------------|--|--|--|---|
| FLT NO. | ORBITER | CREW (7) TITLE, NAMES & EVA'S | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS | SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N. | SRB RSRM AND ET | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS 51-G (STS-25) SEQ FLT # 18 KSC 18 PAD 39A-18 | OV-103 Flight 5 Discovery OMS PODS LPO4 - 1 RPO3 - 5 FRC3 - 5 | CDR: Daniel C. Brandenstein (Flt 2 - STS-8) P80/R21/V16/M20 PLT: John O. Creighton P81/R63/M58 M/S: John M. Fabian (Flt 2 - STS-7) R82/R18/V17/M18 M/S: Steven R. Nagel P83/R64/M59 M/S: Shannon W. Lucid P84/R65/F6 P/S: Patrick Baudry (France) P85/R66/M60 P/S: Sultan S. Al-Saud (Saudia Arabia) P86/R67/M61 | KSC-39A 168:11:33:00Z 7:33:00 AM EDT (P) 7:33:00 AM EDT (A) Monday 5 6/17/85 (3) LAUNCH WINDOW: 4 minutes (CLOSE ON MORELOS EARTH HORIZON SENSOR CUTOUT - 10 MINUTES WITH WAIVER OF CUTOUT) NEOM - EDW EOM WX - KSC RTLS - KSC TAL - DAKAR (Selected) TAL WX - MORON AOA - EDW AOA WX - NOR/KSC | EDW 23, LAKEBED (EDW 12, LKBD 8) 6:11:52 AM PDT Monday 3 6/24/85 (2) XRANGE: 694 NM ORB DIR: DL 12 AIM PT: CLOSE IN MLGTD: 1117 FT 175:13:11:52.4Z VEL: 202 KGS 198 KEAS HDOT: -2 FPS TD NORM 195: 1387 FT NLGTD: 4990 FT 175:13:12:05Z VEL: 163 KGS HDOT: -8 FPS BRK INIT: 154 KGS AVE BRK DECEL: 8.8 FPS/S | 104/104 109 % 100/104/ 83/65/ 104/65 1 = 2109 (7) 2 = 2018 (6) 3 = 2012 (9) M 3 EOM WEIGHT: 204321 X CG: 1082.1 LANDING WEIGHT: | BI-019 MTR: HPM CASE: MWC ET-20 LWT-13 ET RPT 233K 1:19:15 MET ET BR/UP 219K 1:19:38 MET ET IMPACT LAT: 14.80°N | 28.487° (12) START: END: MAX: | DIRECT INSERTION POST OMS-2 192.37 X 190.37 NM MORELOS DEPLOY 191.1 NM ARABSAT DEPLOY 193.81 NM TELESTAR DEPLOY 196.35 NM SPARTAN DEPLOY 210.3 NM DEORBIT 191 x 150 NM | | CARGO: 44477 Tos. CHARGEABLE: 38258 Tos DEPLOYED: 22832 Tos NON-DEPLOYED: 14866 Tos MIDDECK: 560 Tos RETURNED: 21310 Tos SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 214306 Tos NON-DEPLOYED: 246468 Tos CARGO TOTAL: 556387 Tos PERFORMANCE MARGINS (LBS): FPR: 5088 FUEL BIAS: 849 FINAL TDDP: 160 RECON: -1664 PRIMARY: TELESTAR-3D/ PAM-D DEPLOYED | KSC W/D: OPF 37, VAB 7, PAD 14 = 58 LAUNCH POSTPONEMENTS: - 6/12/85 launch postponed to 6/14/85 due to late OPF start 6/14/85 launch postponed to 6/17/85 because STS 51-D landed at EDW not KSC 2 day extension - 5-day total slip. LAUNCH SCRUBS: None. LAUNCH DELAYS: None. TAL WX: Dakar & Moron go. FLIGHT DURATION CHANGES: None. EVENTS: - MORELOS deployed orbit 6D ARABSAT deployed orbit 18D TELESTAR deployed orbit 32D SPARTAN deployed orbit 51D Rendezvous with SPARTAN Wheels dug into lakebed » 6 inches at end of rollout. |
| S85-32877: STS-51G Crew & Patch MCC FCR-2 (11) FLIGHT DIRECTORS Asc/Ent - T. C. Lacefield Ld/O 1 - L. S. Bourgeois O 2 - J. M. Heflin Plng - C. R. Knarr MOD - T. W. Holloway | | MAX Q = 648 M = 1.24 SRB SEP: 2:04.68 MET MECO: 8:35.77 MET ET SEP: 8:53.93 MET OMS-1: NONE OMS-2: 40:29 MET 179.4 Seconds | WHEELS STOP: 775:13:12:33Z 8550 FT ROLLOUT: 7433 FT 36 SEC WIND: 2H,11L KNOTS OFFICIAL: 2H, 11L DENS ALT: 3727 FT FLT DURATION: 7:01:38:52 169:38:52 S/T: 113:12:03:48 OV-103: 31:03:48:38 DISTANCE: 2,500,000 sm | 204169 X CG: 1083.7 51g-s-225 Wheels dug | | at EDW | VELOCITY 25850 FPS RANGE 4050 NM | | MORELOS-A/ PAM-D DEPLOYED ARABSAT-A/ PAM-D DEPLOYED SPARTAN-101DH (DEPLOYED & RETRIEVED) FEE, ADSF, FPE, HPTE, ASE GO27-OFVLR GO28-OFVLR GO28-OFVLR GO28-OFVLR GO28-GVLR GO25-ERNO GO34-EL PASO/YSLETA G314-USAF/NRL 4 CRYO TNK SETS RMS 13 (S.N. 301) Used for SPARTAN deploy, retrieve, and berth, water dump survey, PKM monitoring, and ARABSAT solar array survey | RENDEZVOUS 6: - With SPARTAN for retrieval and return. SIGNIFICANT ANOMALIES: - WCS Fan Separator 1 motor current high RCS microswitch problems Right RCS fuel x-feed valve 3/4/5 Left RCS OX or Fuel Tank Iso Valve Right RCS OX Tank Iso Valve 3/4/5 S-Band lower left antenna beam switch intermittent MDM FA3 failure (Intermittent output from secondary core power supply) WOW dilemma (wheel off ground 800 ft) RA2 late acquisition TPS debris hits Gas leaks and erosion on both SRM nozzle-to-case joints (blowby). | |

| | SPACE SHUTTLE MISSIONS SUMMARY Page 2-20 - STS 51-F LANDING SITE/ SSME-TL | | | | | | | | | | | | |
|----------------------|---|--|---------------------------|-----------------------------------|--|---------------------------|--------------------|-----------------------|--------|--|---|--|--|
| | | CREW | LAUNCH SITE, | LANDING SITE/ RUNWAY, | SSME-TL NOM-ABORT | SRB | (| ORBIT | | PAYLOAD | MISSION HIGHLIGHTS | | |
| FLT | ORBITER | (7) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | , | JKDH | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, | | |
| NO. | ORBITER | TITLEE0 | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | 1011 | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, | | |
| | | TITLE, NAMES | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) | | |
| | | & EVA'S | | WINDS | ENG. S.N. | | | | | | , | | |
| STS 51-F | OV-099 | CDR: | KSC 39A | EDW 23, LAKEBED | 104/104 | BI-017 | 49.491° | 142.9 X 108.7 | OI5-24 | CARGO: | KSC W/D: OPF 39, VAB 5, PAD 31 = 75 | | |
| (STS-26) | Challenger | C. Gordon Fullerton | 210:21:00:00Z | (EDW 13, LKBD 9) | 109 % | | (1) | NM | (2) | 34400 lbs | | | |
| , , | (Flight 8) | (Flt 2 - STS-3) | 3:23:00 PM EDT (P) | 12:45:26 PM PDT | | SRM: | | | | CHARGEABLE: 33012 lbs | LAUNCH POSTPONEMENT: None. | | |
| SEQ | | P87/R6/V18/M6 | 5:00:00 PM EDT (A) | Tuesday 4 | 100/104/ | HPM | | STANDARD | | 33012108 | LAUNAL CORURA DA PARA TRA | | |
| FLT # 19 | Spacelab 2 | PLT: | Monday 6 | 8/6/85 (1) | 97/65/ 104/91 | CACE | | INSERTION WAS | | DEPLOYED: | LAUNCH SCRUBS/PAD ABORT #2: | | |
| | (IGLOO + | Roy D. Bridges P88/R68/M62 | 7/29/85 (1) | XRANGE: 603 NM | 104/91 | CASE: MWC | | WAS PLANNED | | 0 lbs | - 7/12/85 launch aborted at T-4.2 seconds when SSME #2 (2020) chamber coolant valve (CCV) failed to ramp to 70% | | |
| KSC-19 | 3 PALLETS) | M/S: | LAUNCH WINDOW: | ARANGE. 003 NW | 1 = 2023 (3) | IVIVVC | | PLANNED | | NON-DEPLOYED: 31257 lbs | open by "CMD A," resulting in an MCF, causing shutdown. | | |
| DAD | 3 I ALLE I 3) | F. Story Musgrave | 2 Hours, 25 Minutes | ORB DIR: AL 3 | 2 = 2020 (4) | ET-19 | | ATO AFTER | | 31257 lbs | (pad abort #2). Recycled engine 2020 at pad. | | |
| <u>PAD</u> 39A-19 | THIRD | (Flt 2 - STS-6) | CREW WORKDAY | AIM DT. NOM | 3 = 2021 (4) | LWT-12 | | SSME #1 | | MIDDECK: 1755 lbs | - 17-day launch slip. | | |
| 37A-17 | SPACELAB | P89/R15/V19/M15 | 3 Hours, 50 Minutes | AIM PT: NOM | | | | SHUT | | 1755 lbs | | | |
| | FLIGHT | <u>M/S</u> : | | MLGTD: 3713 FT | | <u>ET</u> | | DOWN | | RETURNED: | LAUNCH DELAYS: | | |
| | | Anthony W. England | service window | 218:19:45:26Z | | <u>ET</u> <u>RPT</u> | | | | RETURNED: 33555 lbs | - 1H37M delay because of an error in a TMBU CMD to | | |
| | | P90/R69/M63 | | VEL: 204 KGS 199 KEAS | | 211K | | <u>DEORBIT</u> | | SHUTTLE | BFS. BFS was Re-IPL'ed and IMU's were realigned. | | |
| | OMS PODS | <u>M/S</u> : | PLS - EDW | HDOT: -0.7 FPS | | 1:03:35 | | 174 X | | ACCUMULATED WEIGHTS: | | | |
| | LPO1 - 7 | Karl G. Henize | SLS - KSC | | | MET | | 164 NM | | WEIGHTS: DEPLOYED: | TAL WX: Zaragoza go, Moron no go. | | |
| | RPO4 - 2 FRC9 - 8 | P91/R70/M64 | AOA - NOR AOA WX - KSC | TD NORM 195: | M 3 EOM | ГТ | | VELOCITY 25814 FPS | | 214306 lbs NON-DEPLOYED: | FLICHT DUDATION CHANCES. | | |
| | FRC9 - 8 | P/S: Loren W. Acton | TAL - ZARAGOZA | 4073 FT | WEIGHT: | <u>ET</u> <u>BR/UP</u> | | RANGE | | NON-DEPLOYED: | FLIGHT DURATION CHANGES: - Extended flight 1 day (+ 1 rev) to provide additional | | |
| | | P92/R71/M65 | (Selected) | NLGTD: 6412 FT | 216894 | 193K | | 4221 NM | | 297780 lbs CARGO TOTAL: 590787 lbs | Spacelab experiment time. | | |
| | | <u>P/S</u> : | TAL WX - MORON | 218:19:45:35Z | 210071 | 1:03:58 | | 1221 14141 | | 590787 lbs | орасоная охронноги шно. | | |
| SPACE | -LAB | John-David F. Bartoe | | VEL: 168 KGS HDOT: -7.1 FPS | X CG: 1079.8 | MET | | | | PERFORMANCE | FIRSTS: | | |
| E | | P93/R72/M66 | MAX Q = 762 | 110017.11F3 | | | | | | PERFORMANCE MARGINS: NOT AVAILABLE | - First flight of Spacelab pallet only. | | |
| 3 . | 里。 | | M = 1.63 | BRK INIT: 126 KGS | <u>LANDING</u> | <u>ET</u> | 51 E | 33-005: | | | - First flight of IPS. | | |
| ž . | ₹ 2 | | | AVE DDV DECEL. | | <u>IMPACT</u> | | riments & IP | 9 | SPACELAB 2 WITH 13 | | | |
| 9 EV | 3 y - 1 g | MCC FCR-1 (8) | SRB SEP: | AVE BRK DECEL: 8 FPS/S | WEIGHT: | LAT: | | pacelab 2 are | | INVESTIGATIONS IN 7 SCIENTIFIC | PROX OPS: With PDP. | | |
| Cks | -76 | FLIGHT DIRECTORS Asc/Ent - T. C. Lacefield | 2:05.24 MET | | 216735 | 48.9°S LONG: | | dropped agai | in at | | CICNIFICANT ANOMALIEC. | | |
| ACTON | BARTOE | O 1 - G. A. Pennington | MECO: | WHEELS STOP: 218:19:46:21Z | X CG: 1081.3 | 159.0°E | | bya/Tunisia | IIISt | SOLAR. | SIGNIFICANT ANOMALIES: - ROMS primary pitch TVC failed to respond properly to | | |
| | | Ld/O 2 - J. T. Cox | 9:41.24 MET | 12282 FT | X CG. 1001.3 | 137.0 L | | erranean co | act | ATMOSPHERIC, | cmds on 7/10/85. | | |
| | | O 3 - A. L. Briscoe | 7 | | | | Medit | erranean co | ası. | ENERGY ASTRO- | - EXP computer failed prelaunch, ECOS loaded in B/U | | |
| | | MOD - E. F. Kranz | ET SEP: | ROLLOUT: | | | | | | PHYSICS, IR | computer. | | |
| | 070 -45 5 | | 9:59.29 MET | 8569 FT 55 SEC | | | | | | TECHNOLOGY | - SSME #1 auto shut down at 5:43 MET. (HPFTP discharge | | |
| | STS-51F F | light Crew | | | | | | | | DISCIPLINES: SOLAR, ATMOSPHERIC, PLASMA, HIGH- ENERGY ASTRO- PHYSICS, IR ASTRONOMY, TECHNOLOGY RESEARCH, AND LIEE SCIENCES | temp B Xducer failed at 3:31 MET & Xducer A failed at | | |
| | 13 | | ABORT-TO-ORBIT | WINDS: | | | No. of Concession, | | | LIFE SCIENCES PDP, VCAP, IRT, CRNE, XRT, SOUP | 5:43) resulting in an ATO call. OMS dump (burn) of 106 | | |
| | | The second | OMS-1: | 10H, 1L KNOTS OFFICIAL: 9H, 3L | | | 1 | | | CRNE, XRT, SOUP | seconds (4134 lbs. Prop) SSME #3 HPFTP temp B failed at 8:12 MET, inhibited | | |
| 177 | 1085 | | 11:41 MET | OTTIOIAL. 711, 3L | | | (3) | 4 | | SUSIM,PGU, | limits and accomplished ATO. | | |
| | | | 106.4 Seconds | <u>DENS ALT:</u> 5610 FT | | | | | | CHASE, HRTS, SUSIM, PGU, SUPERFLUID HELIUM, PLASMA | - Recycled SSME 2020 at pad. | | |
| | | | | FLT DURATION: | | | | | 1 | IDEPLETION | - RMS tile scan to check for ET SOFI damage to Orbiter | | |
| | | | | 7:22:45:26 | | A. | 144 | All the same of | | IPDP PROX OPS | bottom TPS (100 tiles scrapped) | | |
| | 33:00 MI | | | 190:45:26 | | | | 1000 | 1 | CBDE | - GPC body rate data transfer incompatible with Spacelab. | | |
| | A | 6 36 | 121.8 Seconds | S/T: 121:10:49:14 | | | | | 1 | SAREX, SLSTP, CBDE PROX OPS WITH FREE FLYING PDP | - Left SRB yaw axis rate Gyro assy 3 failed hardover | | |
| | | | | <u>3/1</u> . 121.10.49.14 | and the state of t | | | | 100 | | prelaunch (GMEM patch). | | |
| - 10 | | | | OV-099: 55:07:10:16 | | | | | | 4 CRYO TANK | - BFS logged "Stored Protect" after TMBU uplinked. - SSME 2 GH ₂ Pressure Xducer failed. | | |
| Sal. | | 9 | | 55:07:10:16 | | 1 | | A. | | SETS | No depose to business (manuscripes setting) | | |
| 2 100 | OF STREET | | | DISTANCE: | 100 | 1 | 200 | | | RMS 14 (S.N. 302) | 1.0 daago to brakes (tariway inspection). | | |
| No. of the last | NO TO | | | DISTANCE: 2,850,000 sm | 202 | No. | 1 | | | RMS 14 (S.N. 302) Used for PDP deploy and retrieve, waste | RADIATORS DEPLOYED #9 - (port side stowed 3 hours | | |
| | | | | | | 1 | | | | water dump monitor, and belly tile survey | for tile survey). | | |
| | | | | | | | | | | Janu belly the Survey | | | |

| | TAGE STOTTEL INITIATION OF THE PROPERTY OF THE | | | | | | | | | | | | |
|--|--|-------------------------|---------------------|-------------------------------------|----------------|---------------|-----------|--|----------|-------------------------------------|---|--|--|
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | | | |
| | | (5) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | (| ORBIT | | PAYLOAD | MISSION HIGHLIGHTS | | |
| FLT | ORBITER | (5) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, | | |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, | | |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) | | |
| | | & EVAS | | WINDS | ENG. S.N. | | | | | | | | |
| STS 51-I | OV-103 | CDR: | KSC-39A | EDW 23, LAKEBED | 104/104 | BI-020 | 28.541° | <u>DIRECT</u> | OI6-27 | CARGO: | KSC W/D: OPF 27, VAB 7, PAD 22 = 56 | | |
| (STS-27) | Discovery | Joe H. Engle | 239:10:58:01Z | (EDW 14, LKBD 10) | 109% | MTR: | (13) | <u>INSERTION</u> | (2) | 43988 lbs | | | |
| (0.02.) | (Flight 6) | (Flt 2 - STS-2) | 6:55:00 AM EDT (P) | 6:15:43 AM PDT | | HPM | | | | CHARGEABLE: | LAUNCH POSTPONEMENTS: None. | | |
| SEQ FLT 20 | | P94/R3/V20/M3 | 6:58:01 AM EDT (A) | Tuesday 5 | 100/104/ | | | POST OMS-2 | | 38884 lbs | | | |
| | | | Tuesday 2 | 9/3/85 (3) | 70/67/ | CASE: | | 190.51 X | | DEDLOVED. | LAUNCH SCRUBS: | | |
| KSC-20 | | PLT: | 8/27/85 (3) | | 104/103/ | LWC | | 190.2 NM | | <u>DEPLOYED</u> : 30289 lbs | - 8/24/85 launch scheduled for 8:38 AM EDT scrubbed | | |
| | OMS PODS | Richard O. Covey | | XRANGE:692 NM | 73/67 | ET-21 | | | | | because of thunderstorms in launch area and ship in LDA. | | |
| <u>PAD</u> | LPO4 - 2 | P95/R73/M67 | LAUNCH WINDOW: | ODD DID, DI 13 | | LWT-14 | | <u>AUSSAT</u> | | NON-DEPLOY: | - 8/25/85 launch scrubbed because of GPC-5 failure. Re- | | |
| 39A-20 | RPO3 - 6 | | 54 Minutes | ORB DIR: DL 13 | 1 = 2109 (8) | | | <u>DEPLOY</u> | | 8221 lbs | IPL's GPC-5 and fault repeated 11 minutes later. Replaced | | |
| | FRC3 - 6 | <u>M/S</u> : | (PLANAR/ET | AIM PT: NOM | 2 = 2018 (7) | <u>ET</u> | | 190.23 NM | | MIDDECK: | GPC-5. | | |
| | | James D. Van Hoften | IMPACT AREA) | | 3 = 2012 (10) | <u>RPT</u> | | | | MIDDECK: 374 lbs | - 3-day total slip. | | |
| 201 | DUNGE | (Flt 2-STS 41-C) | | MLGTD: 2101 FT | | 232K | | ASC DEPLOY | | | LAUNOU DELAYO CAMAC dalay ayar Wan alay da a la ada a | | |
| COAFE | Clored | P96/R36/V21/M35 | PLS-EDW | 246:13:15:43Z | BI-STABLE | 1:19:03 | | 191.6 NM | | RETURNED: | LAUNCH DELAYS: - 3M1S delay awaiting clearing in cloud | | |
| S. S | . 19 | | SLS-KSC | VEL: 175 KGS 191 KEAS | HPOTP (1) | MET | | | | 13478 lbs | cover and ship in SRB recovery area. | | |
| N XX X X X X X X X X X X X X X X X X X | E | <u>M/S</u> : | ALS-NOR | HDOT: -0.5 FPS | | <u>ET</u> | | SYNCOM-F4 | | SHUTTLE | TAL WX: Dakar no go - clouds, Moron go. | | |
| The same of the sa | Į. | John M. Lounge | AOA-EDW | 11001. 0.011 5 | <u>M 3 EOM</u> | BR/UP | | <u>DEPLOY</u> | | ACCUMULATED | TAL WA. Dakar no go - ciodas, Moron go. | | |
| - 44 | | P97/R74/M68 | AOA WX-NOR,KSC | TD NORM 195: | WEIGHT: | 216K | | 194.6 NM | | WEIGHTS: | FLIGHT DURATION CHANGES: | | |
| | THE STATE OF THE S | | TAL-DAKAR | 1741 FT | 196856 | 1:19:29 | | | | DEPLOYED: 244595 lbs | - Shortened flight 1 day because AUSSAT was deployed | | |
| | | <u>M/S</u> : | TAL WX-MORON | NI CTD. 4204 FT | X CG: 1092.4 | MET | | <u>DEORBIT</u> | | NON-DEPLOYED: | early. | | |
| The last | | William F. Fisher | (SELECTED) | NLGTD: 4384 FT 246:13:15:51Z | | <u>ET</u> | | 242 X | | 306375 lbs | | | |
| | | P98/R75/M69 | | VEL: 144 KGS | <u>LANDING</u> | <u>IMPACT</u> | | 178 NM | | CARGO TOTAL: | EVENTS: | | |
| T2 | S-51I Flig | ht Crew | MAX Q = 735 PSF | HDOT: -5.6 FPS | WEIGHT: | <u>LAT</u> : | | VELOCITY | | 634775 lbs | - Deployed AUSSAT-1 on orbit 5 instead of 17 because of | | |
| | <u> </u> | THE OTEW | M = 1.61 | | 196674 | 11.5°N | | 25829 FPS | | PERFORMANCE | sunshield damage by RMS camera. | | |
| | - MET | | | BRK INIT: 114 KGS | X CG: 1094.2 | LONG: | | RANGE | | MARGINS (LBS): | - Deployed ASC-1 on orbit 7 at 239:22:07:32Z. | | |
| | | - | SRB SEP: | AVE BRK DECEL | | 157.6°W | | 4004 NM | | FPR: 4983 | - Deployed SYNCOM IV-4 on orbit 32 at 241:10:47:55z. | | |
| 11/18 | | | 2:01 MET | 7.3 FPS/S | 51LS-237 | 7. Syncom | 1\/-3 aft | er shove-of | F | FUEL BIAS: 839 | (Failed to operate after achieving operational altitude.) | | |
| 11 | | | | 7.511 5/5 | by Hofton | | | | ' | FINAL TDDP: 176 | - Rendezvous and EVA repair of LEASAT salvage | | |
| | | | MECO: | WHEELS STOP: | | | | | | RECON: -1145 | (SYNCOM IV-3) on days 5 and 6. (Deployed on STS 51- | | |
| | BA TANK | 90 | 8:27.59 MET | 246:13:16:30Z | earlier ca | pturea & r | epaired | by Shuttle. | | PRIMARY: | D.) | | |
| | 760 | | ET OED | 8201 FT | Dr. 740 | | | 1.10/2/92 | | ASC-1/PAM-D | - Bi-Stable Pump - HPOTP minimum throttle of 67 percent | | |
| | | | ET SEP: | BUI UIII. | | | die de | A PLANT OF | | DEPLOYED | (first flight.) | | |
| | | | 8:45.77 MET | ROLLOUT: 6100 FT | 100 | | | The state of the | | AUSSAT-1/PAM-D | RENDEZVOUS 7: To repair SYNCOM IV-3. | | |
| 1 | - OS | | OMC 1 | 47 SEC | | | | The state of the s | | DEPLOYED | NENDEZVOOS 7. TOTOPAII STINCOMITY-5. | | |
| | | | OMS-1: NONE | LAUNDO. | | 77/2 | | (2) | | CANCOM IV 4 | SIGNIFICANT ANOMALIES: | | |
| | | to the same through the | INOINE | WINDS: | | | | N. III | | SYNCOM IV-4 UNQ (LEASAT) | - Tank A water flow rate to galley low. | | |
| | | EMU/TETHERED EVA'S: | <u>OMS-2</u> : | 19H, 0 X KNOTS OFFICIAL: 18H, 0X | | | | 1/100 | 120 | DEPLOYED | - Hydraulic System 3 accumulator bootstrap pressure low. | | |
| | | EV1 - Van Hoften | OWS-2: 40:28 MET | OI 1 ICIAL. 1011, UA | | 1 51 | | | 2 | | - RMS elbow joint failed to respond to computer commands | | |
| | | EV2- Fisher | 183.2 Seconds | DENS ALT : 2982 FT | | | 100 | A | - | MIDDECK: PVTOS | in primary. | | |
| | | | 103.2 SECULIUS | | | | 100 | | | PVTOS PFR/APC | - Potable water nozzle temp dropped to 58°F during supply | | |
| | | EVA1 = 8/31/85 | | FLT DURATION: | | 1 | APE. | A | | MFR | water dump. | | |
| | | 7:20/7:07 | | 7:02:17:42 | 12 12 3 | | And A | | | | - BFS OMS 2 out-of-plane velocity | | |
| MCC FCR-2 | 2 (12) | SS EVA #10 | | 170:17:42 | | 1 | | 200 | | 4 CRYO TK SETS | computation 12.5 FPS higher than PASS. | | |
| | | | | S/T: 128:13:06:56 | 24 1. 3. | alex | 2 | | | RMS 15 (S.N. 301) | - FES topping duct zone H heater B failed. | | |
| FLIGHT DIF | | EVA2 = 9/1/85 | | | | C - 1 | | | | Used for LEASAT | - FRCS thruster FIF chamber pressure failure. | | |
| Asc/Ent - G. | | EV1 = 4:31/4:12 | | <u>OV-103</u> : 38:06:06:20 | | | | | | capture, repair, and | - Rt OMS fuel tank isol vlv A barber pole. | | |
| Ld/O 1 - J. H | | EV2 = 4:31/4:28 | | 38:06:06:20 | | L | | - | 2 | release, waste water | - Galley water flow did not shut off. | | |
| O 2 - W. D. | | SS EVA #11 | | DISTANCE: | | | | 3 3 3 3 3 3 | 43 | dump monitor, and to open AUSSAT | - Right OMS pod AFRSI strip loose. | | |
| Plng - C. R. | Knarr | CAPTURE, REPAIR, AND | | 2,500,000 sm | | 2 | | | * | sunshield | RADIATORS DEPLOYED #10 (one sleep period for DTO) | | |
| MOD - E. F. | Kranz | RELEASE OF | | _,500,000 5111 | | | | | | | LVADIATOKS DELFOTED # IO (OHE 2166h bellog 10LD10) | | |
| | | LEASAT/SYNCOM IV-4 | | | | | | | | | | | |
| | | LEASAT/SYNCOM IV-4 | | | | | | | | | | | |

| | LANDING CITE/ COME TI | | | | | | | | | | | | | |
|---|---|--|--|--|--|---|------------|--|---------------|---|--|--|--|--|
| FLT | ORBITER | CREW (5) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | (| ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, | | | |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) | | | |
| STS 51-J (STS-28) SEQ. FLT # 21 KSC-21 PAD 39A-21 | OV-104 Atlantis (Flight 1) OMS PODS LPO3 - 6 RPO1 - 7 - 1 | CDR: Karol J. Bobko (Flt 3 - STS-6 & STS 51-D) P99/R14/V11/M14 PLT: Ronald J. Grabe P100/R76/M70 M/S: Robert L. Stewart (Flt 2 - STS 41-B) P101/R33/V22/M32 M/S: David C. Hilmers P102/R77/M71 P/S: William A. Pailes (USAF) P103/R78/M72 MCC FCR-2 (13) FLIGHT DIRECTORS: Asc/Ent - G. E. Coen O 1 - C. W. Shaw Ld/O 2 - B. R. Stone Plng - J. M. Heflin MOD - T. W. Holloway | KSC-39A 276:15:15:30Z 11:15:30 AM EDT Thursday 6 10/3/85 (2) PLS - EDW SLS - KSC TAL - Dakar TAL WX - Moron (SELECTED) TAL WX - Zaragoza | EDW 23, LAKEBED (EDW 15, LKBD 11) 10:00:08 AM PDT Monday 4 10/7/85 (2) XRANGE: 432 NM ORB DIR: DL 14 A/IM PT: CLOSE IN MLGTD: 2476 FT 280:17:00:08Z VEL: 187 KGS 192 KEAS HDOT: -2 FPS TD NORM 195: 2206 FT NLGTD: 4873 FT 280:17:00:15Z VEL: 155 KGS HDOT: -5.6 FPS BRK INIT: 117 KGS AVE BRK DECEL: | 104/104 109 100/104/ 68/65/ 104/102/ 74/65 1 = 2011 (2) 2 = 2019 (2) 3 = 2017 (4) M 3 EOM WEIGHT: X CG: LANDING WEIGHT: 190765 | BI-021 MTR: HPM CASE: LWC ET-25 LWT-18 ET RPT 230K 1:23:04 MET ET BR/UP 215K 1:23:25 MET ET IMPACT LAT: 20.6°N LONG: | 28.5° (14) | DEORBIT 254 X 254 NM VELOCITY 26023 FPS RANGE 3986 NM | O16-28 (3) | DOD NO RMS OASIS-2 CLOUDS RME MARC-DN RTPA OCEANS VFT-1 VFT-2 CST AMOS WINCON | KSC W/D: OPF 84, VAB 14 PAD 34 = 132 LAUNCH POSTPONEMENTS: None. LAUNCH SCRUBS: None. FLIGHT DURATION CHANGES: None. LAUNCH DELAY: - Launch delayed because of MPS PV# 6 RPCA erratic. (LH2 prevalve close indicator.) SIGNIFICANT ANOMALIES: - Port MPM shoulder "A" pyro initiator circuit failed self test APU Exhaust Gas temp 2 failed WSB 2 regulator pressure decayed OPS Recorder 2 tracks 7,8, & 9 intermittent ROMS fuel total quantity reading offset TPS damage on left inboard elevon leading edge and in nose cap area Fuel Cell 3 O2 flowmeter failed SSME 1 and 2 pitch and yaw actuator secondary delta pressures high PLB camera "B" difficult to focus and camera "C" Azimuth and elevation failed Airlock hatch "A" tapered pin did not latch in open position Side hatch "T" handle difficult for crew to operate. | | | |
| | | , | | 7.3FPS/S | X CG: 1101.2 | <u>LONG</u> : 148.26°W | | | | | - Side natch "1" handle difficult for crew to operate. | | | |
| 1 | T T ! 1 | /N/C Da:1-a/DC | | The state of the s | 1 | 1 | | The second secon | 1 | 1 | I and the second | | | |

Hilmers/MS --- Pailes/PS



Stewart/MS -- CDR Bobko -- PLT Grabe

WHEELS STOP: 280:17:01:13Z 10532 FT

ROLLOUT: 8056 FT 65 SEC

<u>WINDS</u>: 14H, 1R KNOTS OFFICIAL: 11H, 4R

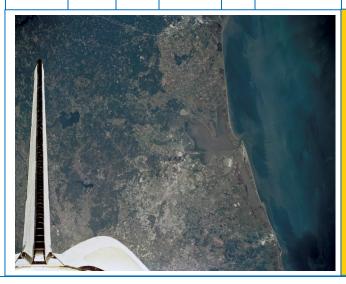
DENS ALT: 3622 FT

FLT DURATION: 4:01:44:38 97:44:38

<u>S/T</u>: 132:14:51:34

OV-104: 4:01:44:38

DISTANCE: 1,682,641 sm



51J-143-126:
Atlantis' vertical
stabilizer (North
side of photo)
partially frames
over-flight
scene of
Metropolitan
Houston, muddy
Galveston &
Trinity Bays,
Galveston
Island, &
Coastline of
Gulf of Mexico.

| | | Page 2-23 - STS 61-A | | | | | | | | | |
|-------------------------------|--|---------------------------------------|---------------------------------|-------------------------------------|----------------------|--|---------------|--|--------|---|--|
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
| | | (8) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | (| ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (-) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, ABORT TIMES | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, WINDS | PROFILE ENG. S.N. | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS 61-A | OV-99 | CDR: | KSC 39A | EDW 17, LAKEBED | 104/104 | BI-022 | 56.998° | STANDARD | 016-29 | <u>CARGO</u> : 31911 lbs | KSC W/D: OPF 35, VAB 4, PAD 14 = 53 |
| (STS-30) | Challenger | Henry W. Hartsfield | 303:17:00:00Z | (EDW 16, LKBD 12) | 109% | DI OZZ | (4) | INSERTION | (4) | 31911 lbs | NOO WIE. OT 30, WIE 1, THE TT 30 |
| (313-30) | (Flight 9) | (Flt 3 - STS-4 & | 12:00:00 PM EST (P) | 9:44:51 AM PST | | MTR: | () | | () | CHARGEABLE: 30519 lbs | LAUNCH POSTPONEMENTS: None. |
| SEQ | | STS 41-D) | 12:00:00 PM EST (A) | Wednesday 2 | 100/89/ | HPM | | <u>POST</u> | | 30519 lbs | |
| FLT # 22 | Spacelab | P104/R8/V5/M8 | Wednesday 1 | 11/06/85 (4) | 65/104/ | | | OMS-2 | | DEPLOYABLE: | LAUNCH SCRUBS: None. |
| | D-1 Flight | PLT: | 10/30/85 (3) | VDANCE (ONA | 102/73/ | CASE: | | 178.99 X | | 150 lbs | |
| KSC-22 | Alle Correctele | Steven R. Nagel (Flt 2 - STS 51-G) | LALINGLUMINDOM | XRANGE: 69 NM | 67 | LWC | | 175.51 NM | | GLOMR GAS | <u>LAUNCH DELAYS</u> : None. |
| 5.45 | 4th Spacelab Flight | P105/R64/V23/M59 | LAUNCH WINDOW: 180 Minutes | ORB DIR: AR 2 | 1 = 2023 (4) | | | GLOMR | | NON-DEPLOY: | TAL WX: Zaragoza, Moron, and Ben Guerir go. |
| <u>PAD</u> 39A-22 | i ligiti | <u>M/S</u> : | (CREW WORKDAY) | AIM DT. NOM | 2 = 2020 (5) | ET-24 | | DEPLOY | | 27330 lbs | TAL WA. Zaragoza, Moron, and ben dueni go. |
| 39A-22 | LM (3) | James F. Buchli | (OREW WORKBATT) | AIM PT: NOM | 3 = 2021 (5) | LWT-17 | | 179.62 NM | | MIDDECK: 2164 lbs | FLIGHT DURATION CHANGES: None. |
| | | (Flt 2 - STS 51-C) | PLS - EDW | MLGTD: 1829 FT | () | | | | | | |
| | OMS PODS | P106/R52/V24/M48 <u>M/S</u> : | SLS - KSC | 310:17:44:51Z | | <u>ET</u> | | | | RETURNED: | <u>FIRSTS</u> : |
| | LPO1 - 8 | Guion S. Bluford | ALS - NOR | VEL: 210 KGS 203 KEAS | M 3 EOM | BR/UP | | | | 30732 lbs | - First flight with redesigned MPS 17" disconnect primary |
| | RPO3 - 7 | (Flt 2 - STS-8) | AOA - NOR | HDOT: -1.2 FPS | WEIGHT: | 188K | | DEODDIT | | SHUTTLE | Seal. |
| | FRC9 - 9 | P107/R22/V25/M21 | AOA WX - NONE TAL - ZARAGOZA | TD NODIA 405 | 214325 | 1:00:57 MET | | DEORBIT 180 X | | SHUTTLE ACCUMULATED WEIGHTS: | - First flight with full nosewheel steering First flight with 8 crewmembers. |
| HARTS | SFIELD | <u>M/S</u> : | (SELECTED) | TD NORM 195: 2549 FT | X CG: 1083.8 | IVILI | | 174 NM | | IDEPLOYED: | - First flight with POCC overseas (Munich). Spacelab D-1 |
| SPAC | ELAB | Bonnie J. Dunbar P108/R79/F7 | TAL WX - MORON | | 7. 00. 1000.0 | ET | | ., | | 244745 lbs NON-DEPLOYED: | flight with objective science and implications of |
| | | | MANUAL TAL - | NLGTD: 4767 FT | <u>LANDING</u> | IMPACT | | <u>VELOCITY</u> | | 335869 lbs CARGO TOTAL: | microgravity. |
| | | <u>P/S</u> : Reinhard Furrer | KOLN/BONN | 310:17:44:59Z VEL: 178 KGS | WEIGHT: | <u>LAT</u> : | | 25829 FPS | | 666686 lbs | |
| d 24 | 5 | (Germany) | | HDOT: -7.8 FPS | 214171 | 59.97°S | | 565 | | DEBEORMANICE. | EVENTS: |
| Carried Comments | | P109/R80/M73 | MAX Q = 665 PSF M = 1.25 | DDV INIT. 111 VCC | X CG: 1085.2 | <u>LONG</u> : 147.96°E | | RANGE 4353 NM | | PERFORMANCE MARGINS (LBS): FPR: 4897 | - GLOMR deployed at 12:34:00 MET (rev 9). - Long-duration gravity gradient attitude (9 - 12 hours per |
| TSCHMID C | OCKELS | P/S: Ernst Messerschmid | IVI = 1.23 | BRK INIT: 111 KGS | A CG. 1005.2 | 147.70 L | | 4333 14141 | | FPR: 4897 FUEL BIAS: 851 | day). |
| | | (Germany) | SRB SEP: | AVE BRK DECEL: | | | | | | FUEL BIAS: 851 FINAL TDDP: 6222 | lady). |
| MCC FCR-1 | (9) | P110/R81/M74 | 2:05 MET | 7.5 FPS/S | | | | | | RECON: 6219 | SIGNIFICANT ANOMALIES: |
| ELIQUE DIDE | | <u>P/S</u> : | | WHEELS STOP: | | First 8-M | 1ember (| Crew | | PAYLOAD: Şpacelab D-1/LM | - Fuel cell 1 condenser exit temperature oscillated. |
| FLIGHT DIRE Asc/Ent - G. E | | Wubbo J. Ockels | MECO: | 310:17:45:40Z | * 0. | | Marie College | The same of the sa | 196 | (Germany) | - Cryo hydrogen tank 1 control pressure failed. |
| Ld/O 1 - L. S. | | (Netherlands) P111/R82/M75 | 8:34.96 MET | 10133 FT | 1414 C | | - | 0 | | , ,, | - RRCS helium leg A operated on secondary. |
| O 2 - G. A. Pe | | PTTT/K02/WI/3 | ET SEP: | ROLLOUT: | | | 75 | | | EXPERIMENTS: WL- 6 Material | - RRCS helium leg B failed closed. - APU 1 gearbox GN₂ P high. |
| O 3 - C. R. Kr | | | 8:53.05 MET | 8304 FT | 1116-1 | | - | A CONTRACTOR | | Science Exps | - Smoke detector B in avionics bay triggered false alarms. |
| MOD - D. R. F | Puddy | | 0.00.00 | 49 SEC | | | | 3186 ON | 2 | Science Exps PK - 3 optical di- agnostic facilities | - S-Band antenna switched late. |
| Sich Control | | | <u>OMS-1</u> : | WINDS: | | | | | | (process chamber) MD - Media (material | - Primary L RCS thruster L2L injector heater failed on. |
| | | | 10:35 MET | OH, 1R KNOTS | N-S | BR | CELAE | 3 | | science), elliptical | - RMS deploy microswitches for shoulder manipulator |
| 2 2 2 3 | MELLE | | 121.4 Seconds | OFFICIAL: 0H, 0X | 1/2 | | | | 11/2 | mirror heating | positioning pedestal went to zero. |
| | The state of the s | | OMS-2: | DENS ALT: 2539 FT | | | | 三73日高 | 7.1 | facility, high precision thermostat | - Stream of particulate matter hit Orbiter WCS fan separator 1 fails. |
| 14 | A A | | 44.40 MET | EL T DUDATION | | | P 01 | | | facility RW - Life Sciences | - LH SRM center and aft field joint gas leaks to |
| | | | 132.7 Seconds | <u>FLT DURATION</u> : 7:00:44:51 | | THE STATE OF THE S | OCKELSE P | | | BW - Life Sciences VS- Vestibular sled | primary O-rings (blowby). |
| 73 | Carita ST | | | 168:44:51 | | THE STREET | THE LAND | E NEA | | IBR - BIOTACK | , |
| 4 | The state of the s | | | C/T 120 1F 2/ 2F | \$85-4078 | 3 Fro | nt row (| left to right) | | NAVES - (Nav Exp) ME - Materials Exp GLOMR (DPLY) | RADIATORS DEPLOYED #11 (stowed for 23 hours in |
| | AND ELL | | | <u>S/T</u> : 139:15:36:25 | Furrer/PS | | | | | GLOMR (DPLY) | -ZLV +YVV) |
| STS61A-45 | 5-0098 One | of many Earh views: | | <u>OV-099</u> : 62:07:55:07 | | | | ield. Back r | .011. | 4 CRYO TANK | |
| | Lake Kronotskaya on the Kamchatka Peninsula | | | 62:07:55:07 | | | | | | SETS | |
| (Russia) an | nd nearby vol | canic mountains in the | | DISTANCE: | | | | Bluford/MS, | | RMS 16 (S.N. 302) | |
| | volcano "Rin | g of Fire' - 30 are still | | 2,501,290 sm | | nmid/PS (| German | ı), & Ockels | /PS | Used for waste water dump monitor | |
| active. | | | | | (Dutch). | | | | | poo. | |

(Dutch).

| | | | SPA | CE SHU | | /11991 | ON2 | | MAI | X I | Page 2-24 - \$1\$ 61-B |
|----------------------------------|----------------------|--|---|---|----------------------------------|--|-----------------|--|---------------|---|---|
| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | (| ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS 61-B (STS-31) | OV-104 Atlantis | CDR: Brewster H. Shaw, Jr. | KSC 39A 331:00:29:00Z | EDW 22, Concrete (EDW 17, CONC 5) | 104/104 109% | BI-023 | 28.454° (15) | DIRECT INSERTION | Ol6-30 (5) | <u>CARGO</u> : 47509 lbs | KSC W/D: OPF 27, VAB 4, PAD 14 = 46 |
| SEQ FLT #23 | (Flight 2) | (Flt 2 - STS-9) P112/R25/V26/M24 PLT: | 7:29:00 PM EST (P) 7:29:00 PM EST (A) Tuesday 3 | 1:33:49 PM PST Tuesday 6 | 100/104/ 65/104/ | MTR: HPM CASE: | | POST OMS-2 | | CHARGEABLE: 42788 lbs | LAUNCH POSTPONEMENTS: None. |
| KSC-23 | OMS PODS | Bryan D. O'Connor P113/R83/M76 | 11/26/85 (5) | 12/03/85 (2) XRANGE: 533 NM | 103/74/ 65 | LWC | | 191.33 X 190.12 NM | | <u>DEPLOYABLE</u> : 27465 lbs | LAUNCH SCRUBS: None. |
| <u>PAD</u> 39A-23 | LPO3 - 7 RPO1 - 8 | M/S: Sherwood C. Spring | LAUNCH WINDOW: 9 Minutes | ORB DIR:AL 4 | 1 = 2011 (3) | ET-22 LWT- 15 | | MORELOS_ | | NON-DEPLOY: 13986 lbs | LAUNCH DELAYS: None. |
| | FRC4 - 2 | P114/R84/M77 <u>M/S</u> : Mary L. Cleave | KU-SAT B/U DPLY- AUSSAT SUN | AIM PT: NOM | 2 = 2019 (3) 3 = 2017 (5) | ET RPT | | <u>DEPLOY</u> 192.71 NM | | MIDDECK: 1337 lbs | NIGHT LAUNCH: Shuttle #2 TAL WX: Dakar go, Moron no-go - clouds. |
| | | P115/R85/F8 <u>M/S</u> : | SHIELD FAIL PLS - EDW | MLGTD: 2386 FT 337:21:33:49Z VEL: 201 KGS | | 231 K 1:19:20 | | AUSSAT DEPLOY | | RETURNED: 20074 lbs | FLIGHT DURATION CHANGES: |
| | FAVE POS | Jerry L. Ross P116/R86/M78 P/S: | SLS - KSC ALS - NOR | 191 KEAS HDOT: -1.0 FPS | | MET | | 196.43 NM | | SHUTTLE ACCUMULATED | - EDW lakebed wet, changed to EDW 22 and landed one rev early due to lighting conditions on EDW 22. |
| Name of the second | SPAN | Charles Walker (Flt 3 - STS 41-D | AOA - EDW AOA WX - NOR, | TD NORM 195: 2026 FT | M 3 EOM WEIGHT: | <u>ET</u> <u>BR/UP</u> 207 K | | SATCOM DEPLOY 197.17 NM | | WEIGHTS: DEPLOYED: 272210 lbs | - Shortened flight by one rev. EVENTS: |
| Walves | WERI | & STS 51-D) P117/R42/V12/M40 P/S: | KSC TAL - DAKAR (SELECTED) | NLGTD: 5909 FT 337:21:34:00Z | 205880 X CG: 1084.4 | 1:19:56 MET | | DEORBIT | | NON-DEPLOYED: 351192 lbs CARGO TOTAL: | - OMS-1 not performed. - MORELOS deployed 331:07:46:50Z (rev 6). |
| KER | | Rudolpho Neri Vela (Mexico) P118/R87/M79 | TAL WX - MORON | VEL: 160 KGS HDOT: -3.6 FPS | LANDING: | ET | | 209 X 172 NM | | 714195 lbs PERFORMANCE | - AUSSAT deployed 332:01:21Z (rev 17). - SATCOM deployed 332:21:57:31Z (rev 31). - EVA 1 - Assembled/disassembled - ACCESS ten bays |
| MCC FCR-2 | (14) | EIIIO/ I E I I I E E I I I E | MAX Q = 723 PSF M = 1.16 | BRK INIT: 126 KGS AVE BRK DECEL: | WEIGHT: 205732 | <u>IMPACT</u> <u>LAT</u> : 17.31°N | | VELOCITY 25882 FPS | | MARGINS (LBS): FPR: 5284 FUEL BIAS: 849 | and six EASE assembly/disassembly cycles. - EVA 2 - Completed all tasks. |
| FLIGHT DIRE Asc/Ent - G. E | | EV1 - Jerry Ross EV2 - Woody Spring EVA 1 - 11/29/85 | <u>SRB SEP</u> : 2:03.56 MET | 7 FPS/S | X CG: 1085.9 | LONG: 156.69°W | | RANGE 4099 NM | | FINAL TDDP: 874 RECON: 2332 | SIGNIFICANT ANOMALIES: |
| O 1 - W. D. Ro Ld/O 2 - J. T. | eeves Cox | 5:34 -SS EVA#12 <u>EVA 2</u> - 12/1/85 | MECO: | WHEELS STOP: 337:21:35:07Z 13145 FT | | | 1378 | | 30 | <u>PAYLOADS</u> : SATCOM KU-2/ | Excess helium in cryo 02 fans 1 and 2. Fuel cell 2 performance degraded and CPM hung up. OMS XFD OX Center Heater failed. |
| Plng - C. W. S MOD - D. R. F | | 6:46 - SS EVA #13 DEMO SPACE STATION ASSEMBLY | 8:31.29 MET ET SEP: | ROLLOUT: 10759 FT | | | 1 :: | | | PAM D-2 DEPLOYED | - OMS AFD OX Certier Heater failed WSB #3 Reg. pressure decay Port PLS R-T-L CLOSE A failed. |
| | | TECHNIQUES | 8:49.45 MET | 78 SEC WINDS: | | | | A) | | MORELOS-B/ PAM-D DEPLOYED | - Port PLBD aft. - NLG Strut 3" low. |
| | | | <u>oms-1</u> : None | 8T, 2R KNOTS OFFICIAL:4T, 4R | | | 10 | | | AUSSAT-2/PAM-D DEPLOYED SKT | Volume H locker had to be pried open. GSE side hatch "T" handle broke. Gas leaks and erosion to both nozzle-to-case joints |
| TO B | | | <u>OMS-2</u> : 40:25 MET | <u>DENS ALT</u> : 2551 FT | | | | | | EASE/ACCESS/MP ESSIMAX | (blowby on LH SRM) Radiators deployed #12 (deployed for 10-hour DTO) |
| | | TO T | 180.4 Seconds | FLT DURATION: 6:21:04:49 165:04:49 | | 16 | | | | CFES DMOS GAS(1) | , , , , , |
| | 36 | | | <u>S/T</u> : 146:12:41:14 | | - 18 | | | Á | MPSE 4 CRYO TANK | |
| | | 7 | | <u>OV-104</u> : 10:22:49:27 | SETS RMS 17 (S.N. 303) Used for | | | | | | |
| | | | | DISTANCE: 2,466,956 sm | Spring ere | cted a Tow | er known | Ross (above) of as Assembly rectable Space | / | Used for EASE/ACCESS assembly, PKM | |
| S85-3 | 8825 STS | S-61-B Crew Portrait | | | Structures. | | uon or El | ectable Spac | - | monitors, waste water dump monitor | |

| | | | | | | | 0110 | | ,,, ,, | * • | 1 age 2-25 - 010 01-0 |
|---|--|--|---|---|---|--|------|--|--|---|---|
| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | (| ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS 61-C (STS-32) SEQ FLT #24 KSC-24 PAD 39A-24 | OV-102 Columbia (Flight 7) OMS PODS LP04 - 3 RP04 - 3 FRC2 - 7 | CDR: Robert L. Gibson (Flt 2 - STS 41-B) P119/R30/V27/M29 PLT: Charles F. Bolden P120/R88/M80 M/S: George D. Nelson (Flt 2 - STS 41-C) P121/R37/V28/M36 M/S: Steven A. Hawley (Flt 2 STS 41-DR) P122/R39/V29/M38 M/S: Franklin Chang-Diaz P123/R89/M81 P/S: C. W. Nelson (Congressman) P124/R90/M82 P/S: | KSC 39A 12:11:55:00Z 6:55:00 AM EST (P) 6:55:00 AM EST (A) Sunday 3 1/12/86 (2) LAUNCH WINDOW: 49 mins SATCOM KU THERMAL CONSTR ORBIT 8A PLS - KSC SLS - EDW ALS - NOR AOA - EDW AOA WX - NOR,KSC TAL - DAKAR TAL WX - MORON (SELECTED) MAX Q = 696 PSF M = 1.13 SRB SEP: 2:07.23 MET | EDW 22, Concrete (EDW 18, CONC 6) 5:58:51 AM PST Saturday 5 1/18/86 (2) XRANGE: 661 NM ORB DIR: DL 15 AIM PT: NOM MLGTD: 1530 FT 18:13:58:51Z VEL: 217 KGS 212 KEAS HDOT: -2 FPS TD NORM 195: 2970 FT NLGTD: 6300 FT 18:13:59:07Z VEL: 160 KGS HDOT: -3.1 FPS BRK INIT: 138 KGS AVE BRK DECEL: 7.2 FPS/S WHEELS STOP: 18:13:59:50Z | 104/104 109% 100/104/ 85/69/ 104 1 = 2015 (5) 2 = 2018 (8) 3 = 2109 (9) BI-STABLE HPOTP (2) M 3 EOM WEIGHT: 210325 X CG: 1083.6 LANDING: WEIGHT: 210161 X CG: 1085.1 | BI-024 MTR: HPM CASE: LWC ET-30 LWT- 23 EI RPT 239K 46:25 MET EI BR/UP 192K 47:41 MET EI IMPACT LAT: 28.3°S LONG: 81.3°E | (16) | STANDARD INSERTION | (1) | CARGO: 32733 lbs PAYLOAD CHARGEABLE: 28625 lbs DEPLOYABLE: 12351 lbs NON-DEPLOY: 15837 lbs MIDDECK: 437 lbs RETURNED: 20111 lbs SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 284561 lbs NON-DEPLOYED: 367466 lbs CARGO TOTAL: 746928 lbs PERFORMANCE MARGINS (LBS): FPR: 5407 FUEL BIAS: 840 FINAL TDDP: 10754 | LAUNCH POSTPONEMENTS: None. LAUNCH SCRUBS: - 12/18/85 launch scrubbed to complete RCS crossfeed work in aft compartment (rescheduled before PRSD loading). 1-day slip 12/19/85 launch scrubbed after autohold at T-14 seconds due to RH SRB tilt HPU exceeding RPM redline (oversensitivity in control circuit). Launch rescheduled after holidays for 1/6/86. 18-day slip 1/6/86 launch scrubbed at T-31 seconds when GSE LO2 replenish valve failed to close. Wrong manual command sequence resulted in TSM vent and drain valves opening without closing Orbiter fill/drain valve causing off-loading of approximately 18,000 lbs LO2 via F/D valve. LO2 SSME temperature dropped below redline limit and count recycled to T-20 minutes. Did an IMU alignment; however, launch was scrubbed when SATCOM launch window expired. Detanked and found a broken GSE LOX temperature probe lodged in SSME #2 prevalve (would have precluded full prevalve closure). Launch rescheduled for 1/7/86. 1-day slip 1/7/86 launch was scrubbed at T-9 hold due to bad weather at TAL sites (Dakar & Moron) and marginal KSC weather. Forty-eight hour turnaround for ovality check on MPS low pressure fuel duct. Rescheduled launch for 1/9/86. 2-day slip. |
| | GHER KOOT | R. J. Cenker (RCA) P125/R91/M83 MCC FCR-1 (10) FLIGHT DIRECTORS: Ascent - G. E. Coen Ld/O 1 - J. H. Greene O 2 - J. M. Heflin Plng - G. A. Pennington MOD - T. W. Holloway MCS - S. E. Coen MECO: 8:21.29 MET ROLLOUT: 10202 FT 59 SEC WINDS: 2T, 0X KNOTS OFFICIAL: 1H, 1R DENS ALT: 1088 FT FLT DURATION: 6:02:03:51 146:03:51 136:38 Seconds ΔV = 216.9 FPS S/T: 152:14:45:05 OV-102: 41:01:54:11 DISTANCE: 2,197,305 sm | 61c-005- 0036 - US Rep. C.W. Nelson, from Flordia, at work in space. | | 4 | | | RECON: 11127 PAYLOADS: SATCOM KU- 1/ PAM D2 DEPLOYED MSL-2 HITCHHIKER INFRARED - IMAGINING EXP 13 GAS CANS CHAMP IBSE HPCG STUDENT EXP (3) NORMS ACIP AADS 4 CRYO TK SETS NO RMS | - 1/9/86 launch was scrubbed on 1/8/86 because of predicted bad weather at KSC. and temperature GSE probe found in SSME #2 prevalve. Rescheduled launch for 1/10/86. 1-day slip 1/10/86 launch scrubbed due to rain showers at KSC with 45 minutes remaining in window. Rescheduled launch for 1/12/86). 2-day slip 25-day total slip. LAUNCH DELAYS: None. TAL WX: Dakar no-go - dust, Moron go. FIRSTS - First flight of OV-102 after major mod (included removal of ejection seats and modifying display panels). Continued | | |

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME. | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | (| ORBIT | ES/M | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|--------------|-------------------------------|--|-------------------------------|-------------|-----|-------|---------|---------------------|--|
| ILI | UNDITER | | LII TOTT TIIVIL, | CICOSSICATIOL | LIVILINO | IVOIVIVI | | | 1 3 4 4 | WLIGHTS, | (LAUNCH SCRUDS/DELATS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | Q LVA 3 | | WINDS | ENG. S.N. | | | | | | |

STS 61-C



61C-14-0008 Crew in middeck; CDR Gibson (lower right corner), others counter-clockwise from upper right: PLT Bolden, U.S. Representative C.W. Nelson/PS, Cenker/RCA-PS, Hawley/MS, Chang-Diaz/MS, G.D. Nelson/MS

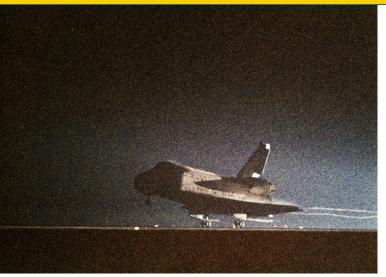


AT LEFT: 61C-13-005 -- The crew, having received excellent service from the Waste Management System, showed this photo at their Jan. 23, 1986 Post-Flight Press Conference.



ABOVE: 61C-005-0036 -- SATCOM Ku-1 Communications Satellite deployed from Columbia.

BELOW: 61C-S-050 (18 January 1986) --- Second Shuttle night landing. View is of the Shuttle's main landing gear touching down at EAFB with streams of light trailing behind the orbiter.



Continued . . .

FLIGHT DURATION CHANGES:

- Management decision made to change flight duration to 4 days from 5 days.
- Extended flight from 4 to 5 days due to bad weather at KSC (was 1/16/86).
- Extended flight from 5 to 6 days due to bad weather at KSC (was 1/17/86).
- Waved off KSC landing on 1/18/86 due to bad weather and landed at EDW (one rev extension).
- Flight extensions, 2 days + 1 rev.

LANDING SITE CHANGE:

- KSC to EDW.

NIGHT LANDING:

- Second Shuttle night landing.

EVENTS:

- SATCOM deployed at 9:32 MET (REV 7).
- Bi-stable Pump HPOTP required minimum throttle of 67 percent (second flight).

SIGNIFICANT ANOMALIES:

- Fuel cell power source to essential bus 1 BC erratic.
- APU 1 gearbox GN₂ pressure high .
- APU's 1 and 3 isolation valve temperatures low.
- APU 3 fuel line system B heater failed .
- Vernier RCS jets fired excessively.
- S-band U/L and L/R antenna performance erratic.
- ECLSS pressure control system 2 oxygen flow transducer read low.
- WSB 3 System "A" heater operation erratic.
- Left RCS Helium Reg "B" leaked.
- WSB 1 system "A" cooling water use high.
- Gas leak in LH SRM nozzle-to-case joint (blowby).
- Gas leak and erosion in RH SRM nozzle-to-case joint.

SSME-TL

| FLT NO. | ORBITER | CREW (7) TITLE, NAMES & FVA'S | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, | NOM-ABORT EMERG THROTTLE PROFILE | SRB RSRM AND ET | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
|--|--|--|--|---|---|--|------------------------------|---|---------------|---|--|
| | | 5. 2 5 | | WINDS | ENG. S.N. | | | | 215.5 | | |
| STS 51-L (STS-33) SEQ FLT #25 KSC-25 PAD 39B-1 | OV-099 (Flight 10) Challenger OMS PODS LVO1 - 7 RVO1 - 7 FRC9 - 10 | CDR: Francis R. Scobee (Flt 2 - STS 41-C) P126/R34/V30/M33 PLT: Michael J. Smith P127/R92/M84 M/S: | KSC 39B 28:16:38:00.1Z 9:38:00 AM EST (P) 11:38:00 AM EST (A) Tuesday 4 1/28/86 LAUNCH WINDOW: | | 104/104 109% 1 = 2023 (5) 2 = 2020 (6) 3 = 2021 (6) | BI-026 MTR: HPM CASE: LWC ET-26 LWT-19 | 28.45° | PLANNED STANDARD INSERTION 153.5 NM | OI7-26 (2) | CARGO: 52685 lbs CHARGEABLE: 48633 lbs DEPLOYABLE: 37636 lbs | KSC W/D: OPF 30, VAB 5, PAD 28 = 63 LAUNCH POSTPONEMENTS: - On 12/23/85, the 1/22/86 launch was postponed 1 da to 1/23/86 to accommodate an integrated simulation (STS 61-C launch delay impact). 1-day slip On 1/22/86, the 1/23/86 launch was postponed 2 day to 1/25/86 because of KSC work schedule being |
| исная | ONIZUA - RECEBER | Judith A. Resnik (Flt 2 - STS 41-D) P128/R41/V31/F2 M/S: Ronald E. McNair (Flt 2 - STS 41-B) | ZAUNCH WINDOW. 3 HOURS TAL SUNSET (CASABLANCA) PLS - KSC SLS - EDW | FLT DURATION: 00:00:01:14 | | rew pho | | Commander | | NON-DEPLOYED: 10167 lbs MIDDECK: 830 lbs | impacted by STS 61-C landing delays. 2-day slip. LAUNCH SCRUBS: - 1/25/86 launch scrubbed early in count by MMT due to forecast of unacceptable weather at KSC throughout launch window. Launch rescheduled for 1/27/86. |
| SCOBEE MCAULIFFE | SMTH JARNIS | P129/R32/V32/M31 M/S: Ellison S. Onizuka (Flt 2 STS 51-C) | TAL - CASABLANCA TAL WX - DAKAR MAX Q = 720 PSF M = 1.35 | <u>S/T</u> : 152:14:46:19 <u>OV-099</u> : 62:07:56:21 | Mission Sp Ellison S. C Payload Sp | ecialists Inizuka, ecialists | Judith / Ronald Gregor | ichael J. Sm A. Resnik, E. McNair a ry B. Jarvis a S85-44253) | and and | PRIMARY: TDRS-B/IUS-3 SPARTAN - HALLEY/MPESS | - 1/27/86 launch scrubbed. Countdown halted at T-9 minutes when a GSE hatch fixture could not be remove from exterior of side hatch, followed by a problem with portable drill. Handling tool attach screw was drilled ou One hour and 20 minutes later, when the hatch problem |
| MCC FCR-2 (15) FLIGHT DIRECTORS: Asc - J. H. Greene Ent - A. L. Briscoe Ld/O 1 - B. R. Stone O 2 - C. W. Shaw Plng - C. R. Knarr MOD - D. R. Puddy P130/R51/V33/M47 P/S: Gregory Jarvis (HAC) P/131/R93/M85 P/S: Christa McAulliffe (Civilian Teacher) P132/R94/F9 | | | | | IN MEMOR | | Adillie. | 365-44253) | | ANCILLARY: CHAMP FDE RME TISP PPE SSIP (3) | was resolved, the winds at KSC RTLS runway had increased and exceeded the maximum allowable crosswind velocity. Launch rescheduled for 1/28/86. 6-day total slip. - During the night, the temperature at KSC dropped to low twenties. Ice had accumulated in the pad area and ice inspections were made during night and morning of 1/28. |
| Shuttle | Legacy Mu | ural - In KSC LCC Firing F | Room | | | Y | | | | ACIP 3 CRYO TANK SETS | LAUNCH DELAYS: - 1H00M delay during T-3 hour hold due to late ET tanking start caused by a GSE H ₂ fire alarm detector problem in LH ₂ ground storage tank. |

LANDING SITE/



CRFW

CHALLENGER TRIBUTE

KSC-2010-4451 (http://mediaarchive.ksc.nasa.gov/index.cfm). This Tribute Display features Challenger, which blazed a trail for other vehicles with the first night landing (STS-8) and also the first landing at Kennedy Space Center (STS-41B). The spacewalker represents Challenger's role in the first spacewalk during a space shuttle mission (STS-6) and the first untethered spacewalk (STS-41B). Crew-designed patches for each of Challenger's missions lead from earth toward our remembrance of the STS-51L crew. Other significant accomplishments include the first night launch with STS-8; the first in-flight capture, repair, and redeployment of an orbiting satellite during STS-41C; the first American woman in space (Sally Ride on STS-7); the first African-American in space (Guion Bluford on STS-8); and the first American woman to walk in space (Kathryn Sullivan during STS-41G). By Mike Leinbach/Launch Director & Amy Simpson/KSC PH-2 in May 2010

0. VAB 5. PAD 28 = 63

ONEMENTS:

- scrubbed early in count by MMT due to eptable weather at KSC throughout aunch rescheduled for 1/27/86.
- scrubbed. Countdown halted at T-9 SSE hatch fixture could not be removed de hatch, followed by a problem with a ndling tool attach screw was drilled out. minutes later, when the hatch problem winds at KSC RTLS runway had ceeded the maximum allowable Launch rescheduled for 1/28/86.
- the temperature at KSC dropped to the had accumulated in the pad area and ere made during night and morning of

1H00M additional delay after ice team inspection of ice formed by leaking H₂O hoses. The decision was made to allow additional time for ice on pad to melt.

2H00M launch delay total.

RMS 18 (S.N. 302)

- Launch occurred at 11:38:00.010 a.m. EST on January 28, 1986.
- Explosive burn at MET of 74 seconds.

- First Shuttle launch from pad 39B.
- First flight to use Casablanca as TAL site.
- First flight to use DIAL-A-TAL site.
- First Shuttle failure in flight. Destroyed Vehicle and Crew.

| | SPACE SHUTTLE WISSIONS SUMMARY Page 2-28 - \$15-26 | | | | | | | | | | | | |
|-------------------------------------|--|--|---|---|--|--|----------------|--|---|---|---|--|--|
| FLT NO. | ORBITER | CREW (5) | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES | SSME-TL NOM-ABORT EMERG THROTTLE | SRB RSRM AND | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, | | |
| 140. | | TITLE, NAMES & EVA'S | ABORT TIMES | FLT DURATION, WINDS | PROFILE ENG. S.N. | ET | | 100111 | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) | | |
| STS-26 (STS-26R) SEQ FLT #26 | OV-103 (Flight 7) Discovery | CDR: Frederick H. Hauck (Flt 3 - STS-7 & STS 51-A) P133/R17/V7/M17 | KSC 39B 273:15:37:00Z 9:59:00 AM EDT (P) 11:37:00 AM EDT (A) Thursday 7 9/29/88 (1) | EDW 17L (EDW 19, LKBD 13) 9:37:11 AM PDT Monday 5 10/3/88 (3) | 104/104 109% 104/102/ 65/104/ | BI-029 RSRM 1 360L 001 ET-28 | 28.46° (17) | DIRECT INSERTION POST OMS-2 162.61 X | OI-8B (1) | CARGO: 46448 lbs PAYLOAD CHARGEABLE: 44601 lbs DEPLOYABLE: | KSC W/D: OPF 221, VAB 13, PAD 88 = 322 LAUNCH POSTPONEMENTS: - 9/26/88 launch postponed 3 days to 9/29/88 for Orbiter aft critical path. 3-day slip. | | |
| KSC-26 <u>PAD</u> 39B-2 | OMS PODS LPO4 - 4 RPO3 - 8 FRC3 - 7 | PLT: Richard O. Covey (Flt 2 - STS 51-I) P134/R73/V34/M67 M/S 1: John M. Lounge (Flt 2 - STS 51-I) P135/R74/V35/M68 | WINDOW DURATION: 3 HOURS (CREW CONSTRAINT) PLS - EDW SLS - NOR AOA - EDW | DEORBIT BURN: 277:15:34:44Z XRANGE: 383 NM ORB DIR: DL 16, REV 64 AIM PT: NOM MLGTD: 2569 FT 277:16:37:11Z | 1 = 2019 (4) 2 = 2022 (1) 3 = 2028 (1) M 3 EOM WEIGHT: 194347 | LWT-21 ET RPT 231K 1:17:18 MET ETBR/UP 211K 1:17:51 | | 169.02 NM TDRS-C DEPLOY 165.88 NM | | 37514 lbs NON-DEPLOYED: 5928 lbs MIDDECK: T159 lbs RETURNED: 8964 lbs | LAUNCH SCRUBS: None. LAUNCH DELAYS: - 1H38M delay from 9:59 a.m. EDT due to: (1) winds aloft differed from planned autumn winds with exceedences of WLE-14R and WLE-14L, and (2) PLT and M/S 1 suit fan fuses blew (replaced with 10A fuses but intended 5 amp fuses). FLIGHT DURATION CHANGES: None. | | |
| THE HILL | MERS ARIGO | M/S 2: George D. Nelson (Flt 3 - STS 41-C & STS 61-C) P136/R37/V28/M36 M/S 3: David C. Hilmers | - NOR TAL - BEN GUERIR TAL WX - MORON (SELECTED) AUGMENTED CTG: BANJUL MAX Q = 707 M = 1.16 | VEL: 196 KGS 187 KEAS HDOT: -0.5 FPS (SR + 11 MIN) TD NORM 195: 1849 FT NLGTD: 5671 FT 277:37:16:18Z | X CG: 1096.6 <u>LANDING</u> : WEIGHT: 194184 X CG: 1098.3 | MET ET IMPACT LAT: 12.58°N LONG: 164.04°W | | 177 X 163 NM <u>VELOCITY</u> 25790 FPS <u>RANGE</u> 4117 NM | | SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 322075 lbs NON-DEPLOYED: 374553 lbs CARGO TOTAL: 793376 lbs PERFORMANCE MARGINS (LBS): | TAL WX: - Alternate TAL Moron selected due to rain showers and crosswind violations at Ben Guerir (Prime). FIRSTS: - Return to flight 2 yrs 8 mos after STS 51-L. | | |
| S26-09-00 Crew (No available) | caption | (Flt 2 - STS 51-J) P137/R77/V36/M71 MCC FCR-1 (11) FLIGHT DIRECTORS: Asc/Ent - G. E. Coen O 1 - J. M. Heflin O 2 - C. W. Shaw Ld/Plg - L.S.Bourgeois MOD - T. W. Holloway | M = 1.10 <u>SRB SEP</u> : 2:04.8 MET <u>MECO</u> : 8:33.43 MET <u>ET SEP</u> : 8:50.5 MET <u>OMS-1</u> : | VEL: 150 KGS HDOT: -5.8 FPS BRK INIT: 127 KGS AVE BRK DECEL: 7.2 FPS/S WHEELS STOP: 277:16:37:57Z 10020 FT ROLLOUT: | | Return - | - To - Fli | ght | 1 | PERFORMANCE MARGINS (LBS): FPR: 5169 FUEL BIAS: 949 FINAL TDDP: 1546 RECON: 624 PAYLOADS: PLB: TDRS-C/IUS DEPLOYED OASIS-1 MIDDECK: PYTOS-2 | EVENTS: - TDRS-C deployed at 06:13:05 MET (rev 3) Two engines OMS SEP burn at 06:28:03 MET (16.6 sec, 30.85 FPS) Deorbit burn 168 secs, 324.86 FPS ET Reentry (tumble) - CAST GLANCE violent rupture. SIGNIFICANT ANOMALIES: - Prelaunch H ₂ leak at 4"disc RCS dynatube repair early in flow using clamshell OMS gimbal standby enable 1 fail. | | |
| who you refrom list a | ecognize | MDR - B. R. Stone MDR - R. M. Kelso | 7451 FEET 50 SECONDS WINDS: 3T, 0X KNOTS OFFICIAL: 5H, 1L DENS ALT: 3445 FT FLT DURATION: 4:01:00:11 97:00:11 S/T: 156:15:46:30 OV-103: 42:07:06:31 DISTANCE: 1,430,505 sm | In MCC: & unident | | T. Hollo | oway, A. Col | | ADSF, IRCFE PCG IEF PPE ARC MLE ELRAD SSIP(2) SE84-4 SE84-5 3 CRYO TANK SETS NO RMS | FES high load evap freezing during ascent. FES shutdown during entry after OMS deorbit burn (rust/contamination). Ku-Band failed self test. Antenna would not follow pointing commands. (Had to use alternate stow procedure.) GOX flow control valves 1 and 2 operated sluggish on first cycle. WCS fan separator 1 flooded exhibiting stall currents for 80 secs. STBD PLBD Forward R-T-L "A" Talkback failed to function. APU#3 chamber pressure low. Rt wing TPS damage. 4" LH₂ ET/Orbiter disconnect leak. Radar altimeter failed at 50 feet. Video cassette tapes jammed (4 tapes). | | | |

| | Page 2-29 - \$1\$-27 | | | | | | | | | | |
|--|---|---|---|--|--|---|---------|---|-----------|--|---|
| FLT | ORBITER | CREW (5) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | (| ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-27 (STS-27R) SEQ FLT #27 KSC-27 PAD 39B-3 | OV-104 (Flight 3) Atlantis OMS PODS LPO1 - 9 RPO1 - 9 FRC4 - 3 | CDR: Robert L. Gibson (Flt 3 - STS 41-B & STS 61-C) P138/R30/V27/M29 PLT: Guy S. Gardner P139/R95/M86 M/S 1: Richard M. Mullane (Flt 2 - STS 41-DR) P140/R40/V37/M39 M/S 2: Jerry L. Ross (Flt 2 - STS 61-B) P141/R86/V38/M78 M/S 3: William M. Shephard P142/R96/M87 MCC FCR-2 (16) FLIGHT DIRECTORS: Asc - G. E. Coen O1/Ent - A. L. Briscoe Ld/O 2 - B. R. Stone Ping - C. R. Knarr MOD - T. W. Holloway | KSC 39B 337:14:30:34Z 9:30:34 AM EST Friday 5 12/2/88 (1) PLS - EDW AOA - NOR AOA WX: TAL - ZARAGOZA (SELECTED) TAL WX - MORON BEN GUERIR | EDW 17L (EDW 20, LKBD 14) 3:36:11 PM PST Tuesday 7 12/6/88 (3) DEORBIT BURN: 341:22:29:34Z CROSSRANGE: 520 NM ORBIT DIR: DR 4 AIM PT: NOM MLGTD: 1469 FT 341:23:36:11Z VEL: 204 KGS 194 KEAS HDOT: -1.0 FPS TD NORM 195: 1523 FT NLGTD: 4423 FT 341:23:36:18Z VEL:164 KGS HDOT: -4.9 FPS BRK INIT: 132 KGS AVE BRK DECEL: 9.8 FPS/S WHEELS STOP: 341:23:36:52Z 8592 FEET ROLLOUT: 7123 FEET 41 SECONDS WINDS: 0H, 2L KNOTS OFFICIAL: 0H, 0X DENS ALT: 3047 FT FLT DURATION: 4:09:05:37 105:05:37 | M3 EOM WEIGHT: X CG: LANDING: | BI-030 RSRM 2 360L 002 ET-23 LWT-16 ET RPT 236K 1:24:30 MET ET BR/UP 216K 1:25:03 MET ET IMPACT LAT: 2.86°S LONG: 123.48°W | 57° (5) | DEORBIT 244 X 239 NM VELOCITY 25956 FPS RANGE 4220 NM | OI-8B (2) | DOD FLIGHT PERFORMANCE MARGINS (LBS): FPR: 4698 FUEL BIAS: 968 FINAL TDDP: 2905 * RECON: -286 SECONDARY PAYLOADS: OASIS-II AMOS APE CLOUDS CRUX RME-III VFT-2 RMS 19 (S.N. 201) Used for belly tile damage survey | KSC W/D: OPF 196, VAB 10, PAD 30 = 236 LAUNCH POSTPONEMENTS: None. LAUNCH SCRUBS: - 12/1/88 launch scrubbed due to winds aloft exceedences. Launch rescheduled for 12/2/88. 1-day slip. LAUNCH DELAYS: - Countdown held at T-9 due to winds aloft and at T-31 seconds for TAL weather. TAL WX: - Zaragoza (prime) selected, alternate sites were no go low ceilings at Moron and Ben Guerir. ALTERNATE ASCENT I-LOADS: - LSEAT selected nominal ascent I-loads, no uplink required. FIRSTS: - First flight with alternate ascent I-loads capability First flight using East and West TDRS First flight with no communications blackout during entry (due to favorable comm look angle to West TDRS) First flight of PDRS console position. SIGNIFICANT ANOMALIES: - Left inboard tire leaking since OPF (over-inflation plug seal) APU #2 GG heater system malfunction Humidity separator B flooded TAGS paper jam TPS damage worst to date (707 hits, 298 hits > 1", most on right side bottom of wing and fuselage) Tile survey conducted using RMS end effector camera R RCS Oxidizer B He regulator slow response Cabin temp controller #2 non-responsive L OMS GN ₂ Isolation valve coil failure Engine #3 HPOTP #3 bearing inner race crack due to stress corrosion. Liquid stains, pitting, spalling - chlorine contaminant. |

190956

X CG: 1095.1

<u>OV-104</u>: 15:07:55:04

DISTANCE: 1,812,075 sm

STS027-11-012 --- Crew on flight deck: Left to right CDR Gibson, Mullane/MS, Ross/MS, Shepherd/MS, & PLT Gardner. Floating football was presented to the NFL at the Super Bowl in Miami.

After his smooth landing at EDW, Gibson and others were astonished at severity of tile damage.

| FLT ORBITER NO. | CREW (5) | LAUNCH SITE, | LANDING SITE/ | SSME-TL | | | | | | |
|--|--|--|---|--|-------------|-----|---|-----|---|---|
| | | LIFTOFF TIME, | RUNWAY, CROSSRANGE | NOM-ABORT EMERG | SRB RSRM | (| ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | 13W | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| (STS-29R) (Flight 8) DIscovery SEQ FLT #28 KSC-28 PAD | Michael L. Coats (Flt 2 - STS 41-DR) P143/R38/V39/M37 PLT: John E. Blaha P144/R97/M88 MS: James F. Buchli (Flt 3 - STS 51-C & STS 61-A) P145/R52/V24/M48 MS: Robert C. Springer P146/R98/M89 MS: James P. Bagian P147/R99/M90 | LAUNCH WINDOW: 2.5 HOURS (CREW TIME ON BACK) MAX Q =710 M = 1.44 SRB SEP: 2:04.5 MET MECO: 8:30.8 MET ET SEP: 8:50 MET OMS-1: NONE OMS-2: 39:58 MET 141.4 Seconds 221.8 FPS | EDW 22 (EDW 21, CONC 7) 6:35:50 AM PST Saturday 6 3/18/89 (2) DEORBIT BURN: 77:13:35:15Z XRANGE: 384 NM ORB DIR: AL 5, ORBIT 79, REV 80 AIM PT: NOM MLGTD: 1195 FT 77:14:35:50Z VEL: 204 KGS 205 KEAS HDOT: -3 FPS TD NORM 195: 2085 FT NLGTD: 5027 FT 77:14:36:01Z VEL:162 KGS HDOT: -1.9 FPS BRK INIT: 129 KGS | 104/104 109% 100/104/ 66/104/ 65 1 = 2031 (1) 2 = 2022 (2) 3 = 2028 (2) M3 EOM WEIGHT: 194940 X CG: 1093.7 LANDING: WEIGHT: 194790 X CG: 1095.3 | | | DIRECT INSERTION POST OMS-2 162.59 X 160.27 NM TDRS-D DEPLOY 162.63 NM DEORBIT 178 X 164 NM VELOCITY 25787 FPS RANGE 4163 NM | | CARGO: 47394 lbs PAYLOAD CHARGEABLE: 45316 lbs DEPLOYABLE: 37640 lbs NON-DEPLOYED: 6727 lbs MIDDECK: 949 lbs RETURNED: 9784 lbs SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 359715 lbs NON-DEPLOYED: 38229 lbs CARGO TOTAL: 840770 lbs PERFORMANCE MARGINS (LBS): FPR: 4698 FUEL BIAS: 968 FINAL TDDP: 3772 RECON: 2995 PAYLOADS: PLB: TDRS-D/IUS DEPLOYED SHARE OASIS-1 MIDDECK: IMAX PCG AMOS CHROMEX SSIP (2): SE 82-08 GAS: SE 82-08 CHIX 3 CRYO TK SETS NO RMS | KSC W/D: OPF 94, VAB 11, PAD 39 = 144 LAUNCH POSTPONEMENTS: - 3/11/89 launch postponed 1 day to 3/12/89 to replace MEC #2 3/12/89 launch postponed 1 day to 3/13/89 to replace FPOV actuator. 2-day total slip. LAUNCH SCRUBS: None. LAUNCH DELAYS: - 1H50M launch delay due to winds aloft and ground fog at KSC. TAL WX: - Ben Guerir (prime) selected - weather good throughout. ALTERNATE ASCENT I-LOADS: - LSEAT selected YAW negative which was uplinked (first uplink). FLIGHT DURATION CHANGES: None. FIRSTS: - First flight with corner alternate I-load capability First flight alternate ascent I-load uplinked. EVENTS: - TDRS-D/IUS deployed at 06:12:48 MET (rev 5) SEP burn at 06:27:48 MET, 16.48 seconds, 31.1 FPS - OASIS-1 performed nominally DTO 0517 NWS Runway Evaluation DTO 0518 Revised System Braking Test Deorbit burn 162 seconds, 313.2 FPS. ET ENTRY (TUMBLE) CAST GLANCE: - Tumble rate 62 deg/sec prior to rupture, max DV - 552 FPS, number of pieces-30. Continued |

| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
|-----|---------|--------------|----------------|---------------|-----------|------|-----|-------|-----|-------------|--------------------------------------|
| | | CKLW /E\ | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (5) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | Q EVA 3 | | WINDS | FNG S N | | | | | | |

STS-29

Continued



ABOVE: S89-28089 & KSC-89PC-26---OV-103, suspended by overhead crane hooked to support structure attached at four points, is lowered for mating to ET & SRBs at KSC VAB Bay 1. SSMEs are covered with protective red shields BELOW: STS029-04-029---CDR Coats on OV-103's forward flight deck





STS029-78-003--- IUS / TDRS-D after deployment from Discovery

BELOW: STS029-S-066--- Post Landing: Crew pose with NASA officials. Left to right: PLT Blaha, Bagian/MS, Rear Adm. Richard H. Truly/NASA Associate Administrator for Space Flight, Dr. James C. Fletcher/NASA Administrator, CDR Coats, Buchli/MS and Springer/MS.



Continued . . .

SIGNIFICANT ANOMALIES:

- RCS jet R1U failed off at ET Sep.
- Excessive vapor at H₂ ET/Orbiter umbilical area prelaunch and tower clear.
- TAGS developer overtemp; however, best TAGS performance with more than 660 pages processed.
- Sluggish GOX FCV'S system 1 and 3.
- LH2 disconnect slow to close.
- FES shutdown during deorbit prep switch reconfiguration.
- Unable to dump ops 2 track 4.
- R OMS regulator "A" anomaly (OX & FU tank pressures approx 245 psi).
- SHARE operations had problems due to vapor bubbles in liquid channels.
- İMAX camera drive mechanism problem (belt jumped off track)
- CHROMEX not cooling properly.
- PLBD PORT B CLOSED indicator failed.
- TPS 132 debris hits, 23 greater than 1"

s29-s-0041 -- Flight Directors Lee Briscoe and Ron Dittemore on console in MCC Flight Control Room.



| | | | SFA | CE SHUT | | 1001 | CIAO | | MAI | X I | · · |
|---|----------------------------------|--|--|--|--|-------------|-----------|---|--------------|--|---|
| FLT | ORBITER | CREW (5) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | (| ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | SHEITER | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE | AND ET | INC | HA/HP | 1011 | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-30 (STS-30R) SEQ FLT #29 KSC-29 PAD 39B-5 STS030-72 046 1989- First interpl payload -M -launched b | -05-08 anetary agellan/IUS | CDR: David M. Walker (Flt 2 - STS 51-A) P148/R48/V40/M45 PLT: Ronald J. Grabe (Flt 2 - STS 51-J) P149/R76/V41/M70 M/S 1: Mark C. Lee R150/R100/M91 M/S 2: Norman E. Thagard (Flt 3 - STS-7 & STS 51-B) P151/R20/V14/M19 M/S 3: Mary L. Cleave (Flt 2 - STS 61-B) P152/R85/V42/F8 MCC FCR-1 (13) FLIGHT DIRECTORS: Asc - A. L. Briscoe 0 1/E - R. D. Dittemore Ld/O 2 - J. M. Heflin Plng - W. D. Reeves MOD - L. S. Bourgeois MDR - C. W. Shaw | KSC 39B 124:18:46:58.975Z 1:48:00 PM EDT (P) 2:46:59 PM EDT (A) Thursday 8 5/4/89 (1) WINDOW DURATION: 64 Minutes (TAL LIGHTING) PLS - EDW AOA - EDW TAL - BEN GUERIR (SELECTED) TAL WX - MORON CTG - BANJUL RTLS 15 MAX Q = 676 M = 1.07 SRB SEP: 2:05.26 MET MECO: 8:29.37 MET ET SEP: 8:46.67 MET OMS-1: 10:29 MET 141.72 Seconds 226.29 FPS OMS-2: 44:27 MET 125.32 Seconds 197.03 FPS | WINDS EDW 22, CONC (EDW 22, CONC 8) 12:43:26 PM PDT Monday 6 5/8/89 (2) DEORBIT BURN: 128:18:40:49Z 165.7, DV 326 XRANGE: 350 NM ORB DIR: AL6, AIM PT: NOM MLGTD: 1314 FT 128:19:43:26Z VEL: 204 KGS 196 KEAS HDOT: -1.5 FPS TD NORM 195: 1354 FT NLGTD: 5088 FT 128:19:43:38Z VEL:163 KGS HDOT: -1.7 FPS BRK INIT: 128 KGS AVE BRK DECEL: 6.2 FPS/S WHEELS STOP: 128:19:44:30Z 11609 FEET ROLLOUT: 10295 FEET ROLLOUT: 10295 FEET COLLOUT: 10295 FEET 64 SECONDS WINDS: VARIABLE 290/12G20 11 TO 19 KNOTS RIGHT XWIND OFFICIAL: 5H, 11R DENS ALT: 4900 FT FLT DURATION: 4:00:56:27 96:56:27 S/T: 170:01:27:24 OV-104: 19:08:51:31 | ENG. S.N. 104/104 109% 100/104/ 102/65/ 104/65 1 = 2027 (2) 2 = 2030 (2) 3 = 2029 (2) M 3 EOM WEIGHT: 192558 X CG: 1097.4 LANDING WEIGHT: 192460 X CG: 1099.1 | | Crew: Clo | STANDARD INSERTION POST OMS-2 160.98 X 159.35 NM MAGELLAN DEPLOY 161.84 NM DEORBIT 176 X 160 NM VELOCITY 25788 FPS RANGE 4147 NM | OI-8B (4) | CARGO: 47783 lbs CHARGEABLE: 45823 lbs DEPLOYABLE: 40118 lbs NON-DEPLOYED: 5540 lbs MIDDECK: 165 lbs RETURNED: 7724 lbs SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 399833 lbs NON-DEPLOYED: 387934 lbs CARGO TOTAL: 888553 lbs PERFORMANCE MARGINS (LBS): FPR: 4698 FUEL BIAS: 968 FINAL TDDP: 4709 RECON: 2650 PAYLOADS: PLB: MAGELLAN/IUS (VENUS PROBE) DEPLOYED MID-DECK: AMOS FEA MLE CRYO TK SETS - 3 | KSC W/D: OPF 79, VAB 11, PAD 43 = 133 LAUNCH POSTPONEMENTS: None. LAUNCH SCRUBS: 4/28/89 Launch scrubbed at T-31 seconds due to an SSME 1 LH2 recirc pump failure at T-55 seconds. Launch rescheduled for 5/4/89. 6-day total slip. LAUNCH DELAYS: - 00H43M delay with hold at L-16 minutes due to RTLS ceiling violation. (1:48 PM EDT planned launch). Picked up at 2:15 PM EDT, counted down to T-5 minutes and held. Picked up count at 2:42 PM EDT when RTLS runway 15 was go (33 was no go due to broken ceiling and excessive tailwind). Total launch delay: 58M59S. TAL WX: - Ben Guerir (prime) selected - Good weather at Ben Guerir and Moron. LLOADS: LSEAT selected nominal ascent I-loads - no uplink required. FLIGHT DURATION CHANGE: None. FIRSTS: - First interplanetary payload launch by Shuttle. First crosswind landing test. EVENTS: - Uplinked launch targeting command load ly and del Psi (inertial plane and first stage yaw steering) Uplinked OMS targeting command load for OMS-1 and OMS-2 IUS/Magellan deployed at 6:14:33 MET (rev 5) Sep burn at 6:27:22 MET, 16 secs, 31.6 FPS. ET REENTRY (NO TUMBLE) - CAST GLANCE, poor quality, tumble rate not discernible. SIGNIFICANT ANOMALIES: - SSME 1 LH2 Recirc pump failure GPC 4 quit (poll fail on SM CRT when GPC was taken to standby). IFM replaced GPC Cabin P Xducer test port left on during first launch attempt Excess water from galley H ₂ O dispenser TAGS jam on 19th page Teleprinter character tops illegible Camera A spots on image ARRIFLEX 16MM camera operate lever failure (crew performed IFM) Thruster R1U failed off at ET Sep R RCS OX Helium P A valve failed open FEA problems WONG dilemma. |
| | | | | <u>DISTANCE</u> : 1,477,500 sm | Lee/MS, TI | hagard/N | IS & PLT | Grabe. | | NO RMS | |

| | | | OI F | ICE SHU | | | ON | JOIVII | | X I | Page 2-33 - STS-28 |
|--|---|--|---|--|---|---|--------------------------------|---|-----------------|--|--|
| ELT. | ODDITED | CREW (5) | LAUNCH SITE, | LANDING SITE/ RUNWAY, | SSME-TL NOM-ABORT | | (| ORBIT | FOW | PAYLOAD | MISSION HIGHLIGHTS |
| FLT NO. | ORBITER | TITLE, NAMES & EVA'S | LIFTOFF TIME, LANDING SITES, ABORT TIMES | CROSSRANGE LANDING TIMES FLT DURATION, WINDS | EMERG THROTTLE PROFILE ENG. S.N. | RSRM AND ET | INC | HA/HP | FSW | WEIGHTS, PAYLOADS/ EXPERIMENTS | (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-28 (STS-28R) SEQ FLT #30 KSC-30 PAD 39B-6 | OV-102 (Flight 8) Columbia OMS PODS LPO3 - 8 RPO4- 4 FRC2 - 8 | CDR: Brewster H. Shaw, Jr. (Flt 3 - STS-9 & STS 61-B) P153/R25/V26/M24 PLT: Richard N. Richards P154/R101/M92 | KSC 39B 220:12:37:00Z 8:37:00 AM EDT Tuesday 5 8/8/89 (4) LANDING SITE PRIORITIES: 1. EDW LAKEBED 2. EDW CONC | EDW 17 LEFT (EDW 23, LKBD 15) 6:37:09 AM PDT Sunday 3 8/13/89 (2) <u>DEORBIT BURN</u> : 225:12:36:57Z <u>XRANGE</u> : 186 NM | 104/104 109% 100/104/ 97/65/ 104/65 1 = 2019 (5) 2 = 2022 (3) 3 = 2028 (3) | RSRM 5 360L 005 ET-31 LWT-24 | 57° (6) | | OI-8B (5) | DOD PERFORMANCE MARGINS (LBS): FPR: 4698 FUEL BIAS: 968 FINAL TDDP: 409 RECON: 158 3 CRYO TK SETS | KSC W/D: OPF 190, VAB 11, PAD 25 = 227 LAUNCH POSTPONEMENTS: - 8/7/89 launch postponed to 8/8/89 due to MPS He system. 1-day slip. LAUNCH SCRUBS: None. LAUNCH DELAYS: - Launch delay at T-9 due to an NSP frame sync error and |
| LDAMSON AND AND AND AND AND AND AND AND AND AN | SHAM RUS | M/S 1: James C. Adamson P155/R102/M93 M/S 2: David C. Leestma (Flt 2 - STS 41-G) P156/R45/V43/M42 M/S 3: Mark N. Brown P157/R103/M94 MCC FCR-2 (17) | 3. NOR LAKEBED 4. KSC TAL: Zaragoza TAL WX: Moron (Selected) CLS: Banjul RTLS: KSC 33 AOA: NOR MAX Q = 679 M = 1.12 00:59.3 MET | ORB DIR: AL 7 AIM PT: NOM MLGTD: 5311 FT 225:13:37:09Z VEL: 157 KGS 155 KEAS HDOT: -1 FPS TD NORM 195: 2545 FT NLGTD: 7393 FT 225:13:37:14Z VEL: 125 KGS | M 3 EOM WEIGHT: X CG: LANDING WEIGHT: 200214 X CG: 1089.4 | ET IMPACT LAT: 36.64°S LONG: 149.65°W | | DEORBIT 166 X 160 NM VELOCITY 25803 FPS RANGE 4332 NM | | AMOS HEIN-LO IOCM/APM CLOUDS CRUX RME-III LLL SAM VFT-2 | MMU 1 read problem during G9 to OPS 101 fransition Launch delay due to KSC ground fog. TAL WX: - Zaragoza (prime) NO GO - thundershowers, Ben Guerir NO GO - crosswinds Moron (selected) - GO throughout. I-LOADS: - LSEAT selected nominal ascent I-loads - no uplink required. EVENTS: - No blackout during entry, comm via TDRS-W. |
| | | FLIGHT DIRECTORS: Asc/Ent-R. D. Dittemore O 1 - G. A. Pennington Ld/O 2 - C. R. Knarr Ping - N. W. Hale MOD - T. W. Holloway | SRB SEP: 2:04 MET MECO: 8:15 MET ET SEP: 8:53 MET OMS-1: NONE OMS-2: 37:52:23 MET 106 Seconds | HDOT: -9.5 FPS BRK INIT: 79 KGS AVE BRK DECEL: 6.3 FPS/S WHEELS STOP: 225:13:37:52Z 11326 FEET ROLLOUT: 6015 FEET 46 SECONDS WINDS: 160° @ 6 KTS 5.8H, 1.6 L KTS OFFICIAL: 1H, 6L | | - CANAL | | | | | SIGNIFICANT ANOMALIES: - Prelaunch problem, one of nose gear WOW proximity sensors began indicating weight on nose gear. Indication went away after insertion but returned later in flight causing a WOW dilemma during landing. NWS was enabled by crew by depressing SRB SEP pushbutton MMU input/output error on OPS-1 transition Pilot's seat moved aft during ascent Vernier thruster F5R annunciated "fail leak." - NLG WOW indication failed off Forward RCS F5L thruster heater failed on S-band PA2 power output degraded to 60 watts Potable water dump valve failed open Teleprinter cable shorted causing a 1.5-second short of 51A Freon coolant loop 2 flow degraded about 100 lbs/hr & FCL 1 about 50 lb/hr Radar altimeter 1 and 2 lost attitude reading at 26 feet Hydraulic system 2 unloader valve operation out-of-spec. |
| starting wi | ith Adamson/I MS, Brown/M | middeck: Clockwise MS (mustache) are S, PLT Richards, and tail end of stuffed toy | | DENS ALT: 3670 FT FLT DURATION: 5:01:00:09 121:00:09 S/T: 175:02:27:33 OV-102: 46:02:54:20 DISTANCE: 2,070,943 sm | left at KS transport | C LC Pader pulls ou | 8-09 \$ 39B by it from u | | sporte laund | | - Bódy flap excessive deflection during ascent NSP frame sync errors prelaunch SSME 1 GH₂ flow control valve sluggish. |

684.

animal.

View provided by KSC with alternate number KSC-89PC-

| LANDING SITE LANDING SITE LANDING SITE LANDING SITE LANDING SITE CROSSRANG SRB ORBIT PAYLOAD MISSION HIGH-LIGHTS CANADIC STRESS CANADIC |
|--|
| STS_34 (Filiant 5) ABORT TIMES FIT DURATION, WRDS FNC S.N. SEO S.N |
| Control Cont |
| SRB SEP: 2:04.98 MET MINDS: 190° @ 8 KTS 1H, 4L KTS OFFICIAL: 2H, 3L DENS ALT: 2680 FT ET SEP: 8:50 MET OMS-1: NONE STS-34 crew portrait from left to right: CDR Williams (holding mission insignia), MS/Baker, MS/Chang- SRB SEP: 2:04.98 MET MINDS: 190° @ 8 KTS 1H, 4L KTS OFFICIAL: 2H, 3L DENS ALT: 2680 FT ELT DURATION: 4:23:39:20 1992-12-30 Three years after deploy and eight days after its encounter with Earth's orbit, Galileo views the Moon and Earth from 3.9 million miles. The Moon is in the foreground, moving left to right. Antarctica is visible through clouds (bottom). The NO RMS Cryo O₂ manifold valve tank 2 failed to close. Erratic waste water quantity transducer. HSI primary miles erroneous indication TAGS overtemp indication |

| | | CREW | LAUNCHCITE | LANDING SITE/ | SSME-TL | CDD | | ODDIT | | DAVILOAD | MICCIONULICUITO |
|--------------|------------|--|---------------------------------|--------------------------|----------------------------|--------------------|--------|------------------|-------|-----------------|--|
| | | (5) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | (| ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (3) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | αEVAS | | WINDS | ENG. S.N. | | | | | | |
| STS-33 | OV-103 | CDR: | KSC 39B | EDW 04, CONC | 104/104 | BI-034 | 28.45° | | OI-8B | DOD | KSC W/D: OPF 114, VAB 21, PAD 27 = 162 |
| (STS-33R) | (Flight 9) | Frederick D. Gregory (Flt 2 - STS 51-B) | | (EDW 25,CONC9) | 109% | | (19) | | (6) | | |
| (313-33K) | Discovery | (Flt 2 - STS 51-B) | 327:00:23:29.98Z | (04 - 1ST FLIGHT) | | RSRM 7 | ` , | | ` ′ | | LAUNCH POSTPONEMENTS: |
| SEQ FLT #32 | | P163/R59/V47/M54 | 7:23:30 PM EST | 4:30:19 PM PST | 100/104/ | | | | | PERFORMANCE | - 11/21/89 launch postponed to 11/22/89 due to SRB IEA |
| 3LQ1L1#32 | | | Wednesday 3 | Monday 8 | 97/65/ | ET-38 | | | | MARGINS (LBS): | cable replacement. 1-day total slip. |
| KSC-32 | | PLT: | 11/22/89 (6) | Monday 8 11/27/89 (5) | 104/65 | LWT-31 | | | | FPR: 4698 | |
| K3C-32 | OMS PODS | John E. Blaha | | | | | | | | FUEL BIAS: 968 | LAUNCH SCRUBS: None. |
| PΔD | LPO4 - 6 | (Flt 2 - STS-29) | LANDING SITE | DEORBIT BURN: | 1 = 2011 (4) | <u>ET</u> RPT | | | | FINAL TDDP:1157 | |
| PAD 39B-8 | RP01- 11 | P164/R97/V48/M88 | PRIORITIES: | 331:23:10:51Z | 2 = 2031 (2) | <u>RPT</u> | | | | RECON: 653 | LAUNCH DELAYS: |
| 370-0 | FRC3 - 9 | | 1. EDW LAKEBED | 181.9 Seconds | 3 = 2107 | 237K | | | | | - Launch held at T-5 because of a ground purge problem |
| MLP-2 | | <u>M/S 1</u> : | 2. EDW CONCRETE | VDANCE 22/ NM | | 46:55 | | | | | for GLS confirmation of Shuttle purge flow rate and |
| IVILI Z | | Manley L. Carter, Jr. | 3. NOR | XRANGE:226 NM | | MET | | | | 3 CRYO TK SETS | completion of APU prestart. |
| | | P165/Ŕ106/M96 | 4. KSC | ORB DIR: AL 9 | | | | | | | |
| | | | | OND DIK. AL 7 | | <u>ET</u> BR/UP | | | | | TAL WX: |
| | | <u>M/S 2</u> : | RTLS: KSC 15 | AIM PT: CLOSEIN | | BR/UP | | | | AMOS | - Ben Guerir 36 (prime selected - good weather after marginal ceiling earlier in day. |
| | | F. Story Musgrave | TAL: Ben Guerir 36 | | <u>M 3 EOM</u> | 217K | | <u>DEORBIT</u> | | VFT-1 | marginal ceiling earlier in day. |
| | | (Flt 3 - STS-6 & | (Selected) | MLGTD: 740 FT | | 47:26 | | 302 X | | APE-B | - Banjul contingency site. |
| | | STS 51-F) | CTGY: Banjul | 332:00:30:19Z | WEIGHT: | MET | | 126 NM | | RME-III | |
| | | P166/R15/V19/M15 | AOA: EDW 22 | VEL: 196 KGS | | T | | VELOCITY | | CLOUDS-1A | I-LOADS: |
| | | | | 199 KEAS | | T/V | | VELOCITY | | | - LSEAT selected nominal ascent I-loads, no uplink |
| | | <u>M/S 3</u> : | MAX Q = 729.3 | HDOT: -1 FPS | X CG: | OFF | | 25998 FPS | | | required. |
| | | Kathryn C. Thornton | M = 1.5 | TD NORM 195: | | | | DANCE | | | NICHT LAUNCH Third Chaddle winds to be |
| QEGO | HY BLAK | P167/R107/F11 | 1:02.1 MET | 1042 FT | LANDING | ET IMPACT | | RANGE 4068 NM | | | NIGHT LAUNCH: Third Shuttle night launch. |
| on on | 200 | | CDD CED | 1042 1 1 | <u>LANDING</u> | <u>IMPACT</u> | | 4068 INIVI | | | MANEGEE |
| | 200 | MCC FCD 2 (10) | <u>SRB SEP</u> : 2:06.77 MET | NLGTD: 3982 FT | WEIGHT: | LAT: | | | | | WAVEOFFS: - Waved off landing on fourth day due to high winds at |
| 0 | | MCC FCR-2 (18) | 2:06.77 IVIE I | 332:00:30:26Z | | 28.57°S | | | | | - waved oil landing on fourth day due to high winds at |
| Ä. | | FLICHT DIDECTORS | MECO | VEL:161 KGS | 194282 | LONG: | | | | | EDW and landed one day later. |
| | | <u>FLIGHT DIRECTORS</u> : Asc/Ent - A. L. Briscoe | MECO: 8:26.9 MET | HDOT: -2.2 FPS | V CC. 1004.0 | 86.4°E | | | | | FIDOT CULITTI E ODEWMEMDED DEDI ACEMENT. |
| 4 | | O 1 - N. W. Hale | 8:20.9 IVIE I | | X CG: 1094.8 | 00.4 L | | | | | FIRST SHUTTLE CREWMEMBER REPLACEMENT: - David Griggs died in private aircraft accident while in |
| SQUA | HOTH | Ld/O 2 - C. W. Shaw | ET CED. | BRK INIT: 145 KGS | <u> </u> | | | | | | training in June 1989. He was replaced by Blaha. (This |
| 10 | THORN | Plng - R. M. Kelso | ET SEP: 8:44 MET | AVE BRK DECEL: | 1000 | 1 | | | | | was first US enacoflight crowmomber changeout since Ven |
| | | MOD - T. W. Holloway | 0.44 IVIL I | 8.5 FPS/S | THE REAL PROPERTY. | | | | | E-1/11 | Mattingly was exposed to measles 3 days before Apollo 12 |
| | _ | WOD - 1. W. Holloway | OMS-1: | 0.311313 | | | | A Page 1 | 1.00 | | was first US spaceflight crewmember changeout since Ken Mattingly was exposed to measles 3 days before Apollo 13 launch on April 11, 970. Jack Swigert was his replacement.) |
| | | | 10:25 MET | WHEELS STOP: | manufication of the second | | | | | | adion on April 11, 770. Jack Swigort was his replacement.) |
| | | | 66 Seconds | 332:00:30:02Z | 4.72 | States. | | | | No. of Street | EVENTS: |
| | | | 00 00001100 | 8504 FT | | | | | | | - No entry blackout, comm via TDRS-W. |



<u>OMS-2</u>: 35:16 MET

95.2 Seconds

ROLLOUT: 7764 FEET

46 SECONDS <u>WINDS</u>: 070° @ 8 KTS GUSTS TO 19 KTS

7.2H, 3.5R KTS OFFICIAL: 8H, 2R

120:06:49

OV-103:

52:06:52:10

DISTANCE: 2,045,056 sm

DENS ALT: 2302 FT FLT DURATION: 5:00:06:49

S/T: 185:02:13:42

STS033-22-035, 1989-11-27 On-orbit crew portrait. Clockwise (starting at left) are CDR Gregory, Thorton/MS, PLT Blaha, Carter/MS, and Musgrave/MS.



STS033-82-071,1989-11-27 The island of Timor, Indonesia (9.0S, 125.0E) illustrates the volcanic origin of the over 1500 islands of Indonesia. The linear alignment of the volcanoes indicates the edges of the tectonic plates of the Earth's crust.

No entry blackout, comm via TDRS-W.

SIGNIFICANT ANOMALIES:

- APU 1 Tube oil outlet pressure high during ascent.
 Cabin leak through WCS.
 TAGS jam (did not work during flight).
 Galley rehydration station failed to dispense hot or cold
- FES primary B shut down (overtemped during deorbit

- +X COAS line of sight shift. CDR AMI M/VEL error. MSBLS BITE indication.
- WCCS short battery life.
- Ku-Band radar self test failure.
- Hydraulic system 1 and 2 accumulator pressure locked up
- Cryo oxygen tank 2 check valve stuck twice.

- Broken shear pin on WCS so crew used vice grips to drive

| | | | | CE SHU | | | 0110 | COM | | X I | Page 2-30 - 313-32 |
|------------|-------------------------------------|--|---|--|---|--|------------|---|--|---|--|
| FLT | ORBITER | CREW (5) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | (| ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | STELL T | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE | AND ET | INC | HA/HP | 1011 | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| Crew porti | 7-006 199 rait with a Stadenstein (| & EVA'S CDR: Daniel C. Brandenstein (Flt 3 - STS-8 & STS 51-G) P168/R21/V16/M20 PLT: James D. Wetherbee P169/R108/M97 M/S 1: Bonnie J. Dunbar (Flt 2 - STS 61-A) P170/R79/V49/F7 M/S 2: Marsha S. Ivins P171/R109/F12 M/S 3: G. David Low P172/R110/M98 MCC FCR-1 (15) FLIGHT DIRECTORS: Asc/Ent - A. L. Briscoe L/O1 - G. A. Pennington O 2 - W. D. Reeves Plng - R. E. Castle MOD - B. R. Stone | KSC 39A 09:12:35:00Z 7:35:00 AM EST (P) | WINDS EDW 22, CONC (EDW 26, CONC 10) 20.09:35:36.2Z 1:35:36 AM PST Saturday 7 1/20/90 (3) DEORBIT BURN: 20.08:30:22Z 299.5 Seconds DV 489.7 FPS XRANGE:372 NM ORB DIR: AL10 AIM PT: NOM MLGTD: 1804 FT 20.09:35:36.2Z VEL: 209 KGS 207 KEAS HDOT: -1 FPS TD NORM 195: 3100 FT NLGTD: 6676 FT 20.09:35:51.5Z VEL:160 KGS HDOT: -2.7 FPS BRK INIT: 141 KGS AVE BRK DECEL: 6.3 FPS/S WHEELS STOP: 20:09:35:39.3Z 12495 FEET ROLLOUT: 10731 FEET 64 SECONDS WINDS: 1.9H, 3.5R KTS OFFICIAL: 1H, 4R DENS. ALT: 923 FT FLT DURATION: 10:21:00:36 261:00:36 S/T: 195:23:14:18 OV-102: 56:23:54:56 | ENG. S.N. 104/104 109% 100/104/ 102/65/ 104/65 1 = 2024 (1) 2 = 2022 (4) | BI-035 RSRM 8 ET-32 LWT-25 ET RPT 228K 1:18:32 MET ET BR/UP 189K 1:19:35 MET T/V OFF ET IMPACT LAT: 10.44°N LONG: 157.2°W | 28.5° (20) | DIRECT INSERTION POST 193.48 X 155.76 NM SYNCOM DEPLOY 169.09 NM LDEF RETRIEVE 178.3NM DEORBIT 178 X 173 NM VELOCITY 25823 FPS RANGE 4317 NM | The state of the s | CARGO: 26458 lbs PAYLOAD CHARGEABLE: 18317 lbs DEPLOYABLE: 15316 lbs NON-DEPLOYED: 1962 lbs MIDDECK: 1039 lbs RETRIEVED (LDEF) 21393 lbs RETURNED: 32565 lbs SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 453472 lbs NON-DEPLOYED: 453472 lbs NON-DEPLOYED: 398517 lbs CARGO TOTAL: 963624 lbs PERFORMANCE MARGINS (LBS): FPR: 4698 FUEL BIAS: 968 FINAL TDDP: 1956 RECON: 992 PAYLOADS: LONG DURATION EXPOSURE FACILITY (LDEF) RETRIEVAL AND RETURN SYNCOM IV-5 (DEPLOYED) MIDDECK IOCM IMAX CNCR, PCG (2) FEA, AFE, MLE L3 (LLL) AMOS ACIP AADS 5 CRYO TK SETS | KSC W/D: OPF 86, VAB 10, PAD 33 = 129 LAUNCH POSTPONEMENTS: - 12/18/89 launch postponed 21 days to 1/8/90 due to delays in readiness of pad 39A after pad modification, holidays, and Orbiter aft PCA R&R. LAUNCH SCRUBS: - 1/8/90 launch scrubbed after holding at T-9 minutes, then counting down to T-5 minutes and holding until launch window expired when RTLS weather did not improve (low ceiling/fog). Rescheduled launch for 1/9/90 22-day total slip. |
| | | r, andMS/Low during ay stay in Earth-orbit | | DISTANCE: 4,509,972 sm | STS-32 Li encyclope since STS | edia) Fi | rst flight | from pad 39 | 9A | RMS 20 (S.N. 201) Used for LDEF capture and berth, and PKM burn monitor | |

| | | | CREW (5) | LAUNCH SITE, | LANDING SITE/ RUNWAY, | SSME-TL NOM-ABORT | SRB | C | RBIT | | PAYLOAD | MISSION HIGHLIGHTS |
|-----|-----|---------|--------------|----------------|--------------------------|----------------------|------|-----|-------|-----|-------------|--------------------------------------|
| | FLT | ORBITER | (0) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| | NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| - | | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| - 1 | | | α LVA 3 | | WINDS | FNG S N | | | | | | |

STS-32

Continued



STS032-87-030,1990-01-20 --- SYNCOM IV-5 is deployed from Columbia's payload bay.



STS032-85-051, 1990-01-20---LDEF Retrieval over South America. LDEF proposed by NASA LRC was deployed by STS-41C on 04/13/1984.



Continued . . .

- SIGNIFICANT ANOMALIES:

 GPC 5 (BFS) registered illegal engage input/output term B during final entry checks. BFS was loaded into GPC2, GPC set restrung and GPC5 powered off. (Landing was delayed one revolution.)
- FM transmitter failed.
- APU 3 lubrication oil outlet pressure high (90 psi)
- TAGS paper jammed.
- FAGS paper jammed.
 GO₂ FCV 2 open cycle sluggish.
 Humidity separator water bypass anomalies (free water from SEP B and SEP A).
 Waste water dump line blockage at 18:13:29:00Z, no dumps performed subsequently.
 FES topping duct B string heater failure.
 IMU 1 RM failed (transient 4-axis accel-bias.

- Hydraulic systems 1 and 2 circ pump unloader valves excessive leakage. - BFS GPC errors.
- At 17:23:46:51Z during sleep period, a bad state vector was uplinked just prior to LOS, Orbiter rotated 3°/sec. WSB sys 2 and 3 excessive regulator pressure decay. RMS was used to conduct external survey (TPS).

- Multiple S-Band dropouts.
 Smoke detector 3A transient alarm.
- WBS 3 controller A over controlling.
- Ku-band antenna feed heater erratic.
- MPS LH₂ F&D (outboard) relief valve leak.
- Pilot seat would not drive down.
- CCTV camera problems.
- Heaviest landing at 228,335 lbs.



STS032-15-022 STS032-15-022 STS-32 Commander Brandenstein celebrates birthday on OV-102's aft flight deck.



S89-48717 1989-11-07 STS-32 Flight Directors in MCC standing in front of the flight director's consoles are (l. to r.) Alan L. Briscoe, Granvil A. Pennington, and Robert E. Castle, Jr.

| | | | | LANDING SITE/ | SSME-TL | | | | | | |
|--|------------------------|---|--------------------------------|-------------------------------------|----------------------|-------------------------|-----------|-----------------------|--------|-----------------------------------|--|
| | | CREW | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | (| ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (5) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, WINDS | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| CTC 2/ | | CDR: | KSC 39A | EDW 23L, LKBD | ENG. S.N. 104/104 | BI-036 | 62° | | OI-8C | DOD | KSC W/D: OPF 69, VAB 6, PAD 35 = 110 |
| STS-36 (STS-36R) | OV-104 | John O. Creighton | | (EDW 27, LKBD 17) | 109% | | (1) | | (3) | <u> </u> | |
| , | (Flight 6) Atlantis | (Flt 2 - STS 51-G) P173/R63/V50/M58 | 59:07:50:22Z 2:50:22 AM EST | 63:18:08:44Z 10:08:44 AM PST | 100/104/ | RSRM 9 | | | | PERFORMANCE | LAUNCH POSTPONEMENTS: None. |
| SEQ FLT #34 | Allantis | | Wednesday 4 | | 98/75/ | ET-36 | | | | MARGINS (LBS): | LAUNCH SCRUBS: |
| KSC-34 | | <u>PLT</u> : John H. Casper | 2/28/90 (2) | Sunday 4 3/4/90 (3) | 104/65 | LWT-26 | | | | FPR: 4652 | - 2/22/90 launch was scrubbed while counting from T-11 |
| | 0140 0000 | P174/R111/M99 | | DEORBIT BURN: | 1 =2019 (6) | <u>ET</u> RPT | | | | FUEL BIAS: 999 FINAL TDDP: 881 | hours to T-6 hours for CDR's health (48-hour slip) 2/24/90 launch scrubbed because of predicted bad |
| PAD 39A-26 | OMS PODS LPO1 - 12 | M/S 1: | LANDING SITE | 163:17:11:17.24Z | 2 =2030 (4) | 228K | | | | RECON: 930 | weather at KSC. |
| | RPO3- 11 | David C. Hilmers | PRIORITIES: 1. EDW LAKEBED | 125.48 Seconds 256.4 FPS | 3 =2027 (4) | 1:00:35 | | | | | - 2/25/90 launch scrubbed due to a Range Safety backup computer problem. Count held at T-31 seconds, and |
| MLP-1 | FRC4 - 6 | (Flt 3 - STS 51-J & STS-26) | 2. EDW CONCRETE | | | MET | | | | | during hold, the LO ₂ inlet temps on all 3 engines |
| | | P175/R77/V36/M71 | 3. NOR 4. KSC | XRANGE: 255 NM | | <u>ET</u> BR/UP | | | | MIDDECK | exceeded LCC lower limit. Rescheduled launch for 2/26/90. |
| | | M/S 2: | 4. NSC | ORB DIR: DR 5 | | 217K | | | | RME-III | - 2/26/90 Jaunch scrubbed at T-9 minutes due to bad |
| | | Richard M. Mullane | 1. X-WIND FIRST | <u>AIM PT</u> : CLOSEIN | M 3 EOM | 1:00:53 | | | | VFT-I | RTLS weather (cloudy). Rescheduled launch for 2/28/90. |
| | | (Flt 3 - STS 41-DR & STS-27) | PRIORITY 2. NWS SECOND | MLGTD: 1622 FT | WEIGHT: | MET | | | | VFT-II | 48-hour delay to allow launch team rest. 6 days total slip. |
| | | P176/R40/V37/M39 | PRIORITY | 63:18:08:44Z VEL: 193 KGS | V 00 | T/V ACTIVE | | DEORBIT 122 Y | | | LAUNCH DELAYS: |
| | | M/S 3: | RTLS: KSC 15 | 199 KFAS | X CG: | LAST | | 132 X 115 NM | | | - Delay at T-9 minutes due to predicted rain in RTLS area. Resumed count to T-5 minutes, held for launch pad, RTLS, |
| GHTON | | Pierre J. Thuot | TAL: Zaragoza 30 | HDOT: -1 FPS | <u>LANDING</u> | FLIGHT | | | | | and TAL weather. |
| 8 | | P177/R112/M100 | (Selected) TAL WX: Moron | TD NORM 195: 1959 FT | WEIGHT: | <u>ET</u> | | VELOCITY 25713 FPS | | | TAL WX: |
| e 3 | | MCC FCR-2 (19) | AOA: NOR 17 | | 187200 | <u>IMPACT</u> | | | | | - Zaragoza 30 (prime) - Some delay waiting for STA go |
| E Hard | | FLIGHT DIRECTORS: | MAX Q = 743.9 | NLGTD: 4862 FT 63:18:09:37.32Z | X CG: 1096.4 | <u>LAT</u> : 61.40°S | | RANGE 4338 NM | | | (until ŠTA could see landing strip). - Moron - NO GO - ceiling. |
| 1 | | A/E - R. D. Dittemore Ld/O 1 - L. S. Bourgeois | M = 1.49 | VEL:145 KGS | 7. 00. 1070.1 | LONG: | | 1000 14141 | | | |
| TOLLANE | MERS | O 2 - R. M. Kelso | 00:53 MET | HDOT: -4.4 FPS | | 145.1°E | | | | | I-LOADS: - LSEAT selected yaw positive, alternate I-load uplink 3. |
| | HILM | Plng - C. R. Knarr MOD - T. W. Holloway | SRB SEP: | BRK INIT: 99 KGS | | | NOTE THAT | Mar Tarita | | | , , |
| MANAGER AND SOURCE | Sec. | INOB 1: W. Holloway | 2:05.8 MÉT | AVE BRK DECEL: 5.5 FPS/S | We was | 1 | / | | 1 | | NIGHT LAUNCH: Fourth Shuttle night launch. |
| | 4 | | MECO: | | | 1 | | | | | <u>EVENTS</u> : |
| 建设 水之 | a A | | 8:30 MET | <u>WHEELS STOP</u> : 63:18:09:37.3Z | | | | | | | No entry blackout - comm via TDRS-W Last flight with ET tumble valve active. |
| | 4.75 | A | ET SEP: | 9522 FEET | = /X | | | | | | - |
| | | | 8:48 MĒT | ROLLOUT: | | 1 | | 300 | 5 | | SIGNIFICANT ANOMALIES: - AC2 Phase 2 Inverter failure. |
| 57 | | | <u>OMS-1</u> : | 7900 FEET 53 SECONDS | | 1 | 17 | | 9/ | | - RCS valve position indications intermittent. |
| A december | | | NONE | WINDS: | | 9 | | Q. | - Chi | | - WSB 2 Ven't System A heater failed. - CRT 4 screen went blank. |
| The Const | | | <u>OMS-2</u> : | 15.9H, 1.6R KTS | 2-1 | | | The same of | | | - SSME post powerdown hard failure ID. |
| Control of the contro | The state of | | 32:58.1 MET 105.4 Seconds | OFFICIAL: 16H, 3R | | | 125 | 1 The same | | | - O₂ leak into cabin. - FES overtemp shutdown. |
| 200 | | | 100.4 Seculius | DENS ALT: 3017 FT | | | | | A | | - Humidity separator A degraded operation (found 1 quart |
| | | | | FLT DURATION: | | | | | | | of water below middeck floor). - Supply H2O tank A-B check valve failure. |
| Pilgr | ims first stepped a | ashore November 1620 | | 4:10:18:22 106:18:22 | | | , i | | 1 | | - Supply 120 talls A-B clieck valve failule PLB floodlight failure (2) SPOC H/W and S/W problems. |
| ОТОССС | 154 005 400 | 0.00.04 | 40.001 | <u>S/T</u> : 200:09:32:40 | ОТОООО | 04 004 | 4000 | 0.00 44 | | | - SPOC H/W and S/W problems. - Volume H latch jammed. |
| | | 0-03-04Cape Cod, I Shuttle. Geologically, th | | | | | | 3-03 Atlanti | | /, pose Mullane/MS, | - TAGS paper folding. |
| denosit of | earth and st | one called a terminal mo | oraine left by | OV-104: 28:18:49:13 | | | | | | e conducting | - WSB 2 vent temp heater A failure. |
| | | placiers of about 20,000 | | | a DOD-0 | | | | O WITH | Conducting | - Hyd system leak into aft compartment. - R3D fail-off at ET SEP. |
| ino gradi | | , | , same ago: | <u>DISTANCE</u> : 1,837,962 sm | a DOD (| acaioai. | 74 111133 | 7011 | | | - R4R jet fail-off during RCS hot fire. |

| | | | <u> </u> | AOL OHO | | | | | *** | <u> </u> | |
|---------------------|--------------|---|--|--|------------------------------|---------------------------------|----------|--|-------|--------------------------|---|
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
| | | (5) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | (| ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (3) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | & EVA S | | WINDS | ENG. S.N. | | | | | | |
| STS-31 | OV-103 | CDR: | KSC 39B | EDW 22, CONC (EDW 28,CONC 11) | 104/104 | BI-037 | 28.453° | DIRECT | OI-8C | <u>CARGO</u> : | KSC W/D: OPF 78, VAB 9, PAD 39 = 126 |
| (STS-31R) | (Flight 10) | Loren J. Shriver | | (EDW 28,CONC 11) 119:13:49:57Z | 109% | | (21) | INSERTION | (4) | 28643 lbs | |
| (313 311) | Discovery | (Flt 2 - STS 51-C) | 114:12:33:51Z | 119:13:49:572 | 400/404/07/ | RSRM | | B00T | | 544,045 | LAUNCH POSTPONEMENTS: None. |
| SEQ FLT #35 | | P178/R50/V51/M46 | 8:31:00 AM EDT (P) 8:33:51 AM EDT (A) | 6:49:57 AM PDT | 100/104/97/ | 10 | | POST 2 | | PAYLOAD | LAUNCH CODUDO |
| | | DLT. | Tuesday 7 | Sunday 5 4/29/90 (5) | 67/104/65 | ET-34 | | OMS-2 330.63 X | | CHARGEABLE: 25517 lbs | LAUNCH SCRUBS: - 4/10/90 launch scrubbed during hold at T-4 minutes |
| KSC-35 | OMS PODS | PLT: Charles F. Bolden | 4/24/90 (6) | 4/29/90 (5) | 1 = 2011 (5) | LWT-27 | | 310.80 NM | | 20017 IDS | due to APU anomalies. Rescheduled launch for |
| DAD | LPO4 - 7 | (Flt 2 - STS 61-C) | 4/24/70 (0) | | 1 = 2011 (5) 2 = 2031 (3) | LVV 1-27 | | 3 10.00 IVIVI | | DEPLOYABLE: | 4/24/90 (APU 1 R&R). 14 days total slip. |
| <u>PAD</u> 39B-9 | RPO1- 12 | P179/R88/V52/M80 | LAUNCH WINDOW: | DEORBIT BURN: 119:12:37:36Z | 3 = 2107 (2) | FT | | HST DEPLOY | | 23095 lbs | 4/24/70 (All O T Rarty). 14 days total slip. |
| 39B-9 | FRC3 - 10 | | 2H30M | 119:12:37:36Z | 0 2.07 (2) | <u>ET</u> <u>RPT</u> 251K | | 333.06 NM | | 20070 120 | LAUNCH DELAYS: |
| MLP-2 | | <u>M/S 1</u> : | (CREW TIME | XRANGE: 420 NM | | 251K | | | | NON-DEPLOYED: | - 2M51S delay during hold at T-31 seconds to manually |
| IVILI -Z | | Steven A. Hawley | ON BACK) | | | 1:24:18 | | <u>DEORBIT</u> | | 960 lbs | close F&D valve after failure to close by GLS (procedural |
| (WAS | | (Flt 3 - STS 41-DR | LANDING CITE | ORB DIR: DL 17 | | MET | | 333 X | | MIDDEOK | enhancement problem). |
| STS 61-J) | | & STS 61-C) | LANDING SITE | AIM DT. NOM | | ГТ | | 327 NM | | MIDDECK: 652 lbs | TAL MAY. |
| | | P180/R39/V29/M38 | PRIORITIES: NOEM: | AIM PT: NOM | | <u>ET</u> BR/UP | | VELOCITY | | 00Z ID2 | TAL WX: - Banjul (prime) - NO GO because redundant TACAN's |
| | | M/S 2: | EDW LKBD - Prime | MLGTD: 1176 FT | | 215K | | 26120 FPS | | RETURNED: | down, WX marginal but acceptable. |
| | | Kathryn D. Sullivan | EDW ENDD THING | 119:13:49:57Z | | 1:25:14 | | 20120110 | | 4768 lbs | - Ben Guerir 36 (alternate) selected - marginal but GO. |
| | | (Flt 2 - STS 41-G) | RTLS: KSC 15 | 119:13:49:57Z VEL: 180 KGS 177 KEAS | | MET | | <u>RANGE</u> | | | · |
| URI VER+ | BOLDE | P181/R44/V53/F3 | | HDOT: -4 FPS | | | | 4121 NM | | SHUTTLE_ | I-LOADS: |
| 5 | | M/C 2 | TAL: Banjul (PRI) | TD NODIA 405 | <u>M 3 EOM</u> | T/V OFF | | | | ACCUMULATED | - LSEAT selected nominal I-loads, no uplink required. |
| TEM | | M/S 3: Bruce McCandless II | (Planned) | TD NORM 195: - 130 F I | WEIGHT: | OFF | | | | WEIGHTS: DEPLOYED: | FLIGHT DURATION CHANGE: None. |
| E | No. | (Flt 2 - STS 41-B) | ALT TAL: | | 189309 | ALL SUBS | | | | 476567 lbs | TEIGHT DORATION CHANGE. None. |
| BULLY MEGA | WAS I SULLIL | P182/R31/V54/M30 | Ben Guerir 36 | NLGTD: 4560 FT 119:13:50:09Z VEL:144 KGS HDOT: -3.3 FPS | 107307 | FLTS | | 1111111111 | | NON-DEPLOYED: | FIRSTS/RECORDS: |
| CAND | 11.00 | | (Selected) | 119:13:50:09Z | X CG: 1087.9 | | | | | 400129 lbs | - First planned use of Banjul at primary TAL. |
| | | MCC FCR-1 (16) | , , | HDOT: -3.3 FPS | | <u>ET</u> | | pris | | CARGO TOTAL: | - First flight with carbon brakes. |
| | | | AOA or P/L Return: | | <u>LANDING</u> | <u>IMPACT</u> | | 1 800 | 1 | 992267 lbs | - Highest Shuttle altitude to date - 333 NM. |
| | | FLIGHT DIRECTORS: | 1. EDW 22/04 | BRK INIT: 120 KGS | WEIGHT | LAT: | | | | <u>PERFORMANCE</u> | - Longest OMS burn - 305 seconds. |
| | | Asc - R. D. Dittemore Ent - N. W. Hale | 2. EDW LKBD 3. NOR | AVE BRK DECEL: | WEIGHT: 189118 | 19.95°N | | | | MARGINS (LBS): | EVENTS: |
| | | Ld/O 1 - W. D. Reeves | 4. KSC | AVE BRK DECEL: 5.9 FPS/S | 107110 | LONG: | | | | FPR: 4652 | - HST deployed on rev 20 (1 rev later than planned. |
| | | O 2 - J. M. Heflin | 1. 1.00 | WILLEL C CTOD | X CG: 1089.7 | 150.0°W | / amount | | | FUEL BIAS: 994 | - No entry blackout. |
| | | Plng - A. L. Briscoe | <u>AOA</u> : NOR 23 | WHEELS STOP: 119:13:50:58Z 10065 FEET | | | | | | FINAL TDDP: | , |
| | | MOD - B. R. Stone | | 10065 FEET | TOP: S90 | -32805S1 | S31B | ill Reeves, L | ead | 2861 * | ET REENTRY (NO TUMBLE): |
| | | | MAX Q = 656.3 | | Orbit Fligh | nt Director | . briefs | media at | | RECON: 1352 | - ARGUS - Rupture altitude 246K feet. |
| - V/2 man | | The second second | M = 1.08 00:52 MET | ROLLOUT: 8874 FEET | preflight o | | | | | PAYLOADS: | - AMOS/MOTIF - Tumble rate 7 deg/second. - KPTC RADAR - Max. DV 670 FPS. |
| | | | UU.JZ IVIL I | 61 SECONDS | | | | 1990-04-2 | 9 | PLB: | - VHF RADAR: |
| | | HET THE RESIDENCE OF THE PARTY | SRB SEP: | WINDC | HST is gr | | | | | HUBBLE SPACE | - Number of pieces > 3 feet - 68. |
| | | FOR THE | 2:05.75 MET | 180° @ 7 KTS | | | | uning | | TELESCOPE (HST) | - Debris scatter: 200 NM (UR/DR) 40 NM CR. |
| | | 2 d vg | | WINDS: 180° @ 7 KTS GUSTS TO 10 KTS | predeploy | ment che | ckout. | | | (DEPLOYED) ` ´ | 0101115101117 11101111150 |
| | | 9 | MECO: 8:30 MET | 4.1H, 5.7L KTS | | | | | | ICBC (IMAX) | SIGNIFICANT ANOMALIES: - Cabin depressed to 10.2 PSIA for approximately 72 hours. |
| 1 | | | 0.30 IVIE I | OFFICIAL: 7H, 5L | | | 100 | | | APM | - Supply water tank C bellows stuck. |
| | 99 | | ET SEP: | · · | | | 1 | | | | - Fuel cell 2 purge anomaly. |
| | | | 8:48 MET | <u>DENS. ALT</u> :2993 FT | (1) | | 20 | | 100 | MIDDECK: SE-82-16 | - SPOC failures. |
| | 100 | | | FLT DURATION: | 1 | | | | | (ION ARC) | - ADTA 3 CB contamination. |
| | | | OMS-1: NONE | 5:01:16:06 121:16:06 | | | | | | IMAX | - TAGS problems. |
| | | | INUNE | 121:16:06 | | | | | | RME-III | - WSB 2 steam vent heater A failure. - 70 mm camera iam. |
| | 6 | | OMS-2: | S/T: 205:10:48:46 | | | | Value of the last | | AMOS | - 13A jet failed off, L3A fail leak. |
| | | | OMS-2: 42.36 MET | | | | | 1- | | IPMP | - Erratic ROMS fuel engine inlet pressure. |
| | | | 305 Seconds | OV-103: 57:08:08:16 | | | | 1 | | PCG-III | - HST solar array deploy problem. |
| | | 0-04-29 STS-31 | | 37.00.00.10 | | -0.00 | MAN | | | 3 CRYO TK SETS | |
| | | olden (top left), CDR | | DISTANCE: | | | 100.10 | All lines | | | |
| Shriver, S | ullivan/MS, | McCandless/MS, | | 2,068,213 sm | | 104 | 100 | A Part of the last | | RMS 21 (S.N. 301) | |
| and Hawle | ey/MS | | | | 3375 | Section | The same | Bull | | USED FOR HST DEPLOY | |
| | | | | | | | | | | HOT DEFEUT | |

| | | | 31 <i>F</i> | CE OHO | | | OITC | COMI | | X I | |
|-----------------|--|---|----------------------------------|---|----------------------|------------------|--------------|------------------------|-------|--------------------------------------|---|
| -1- | 0001750 | CREW (5) | LAUNCH SITE, | LANDING SITE/ RUNWAY, | SSME-TL NOM-ABORT | SRB | (| ORBIT | 5011 | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | () | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, WINDS | PROFILE ENG. S.N. | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| OTO 44 | OV-103 | CDR: | KSC 39B | WINDS EDW 22 CONC | 100/100/ | BI-040 | 28.45° | DIRECT | OI-8D | CARGO: | KSC W/D: OPF 109, VAB 8, PAD 32 = 149 |
| STS-41 | (Flight 11) | Richard N. Richards | N3C 39D | EDW 22, CONC (EDW 29, CONC 12) | 109% | DI-040 | (22) | INSERTION | (1) | 49969 LBS | <u>NSC W/D.</u> OPF 109, VAD 0, PAD 32 = 149 |
| SEQ FLT #36 | Discovery | (Flt 2 - STS-28) | 279:11:47:14.98Z | 283:13:57:19Z | 10770 | RSRM | (22) | IIIOEITIOII | (., | | LAUNCH POSTPONEMENTS: Launch postponed from |
| 3LQ1L1#30 | | P183/R101/V55/M92 | 7:35:00 AM EDT (P) | 6:57:19 AM PDT | ACTUAL: | 13 | | <u>POST</u> | | <u>PAYLOAD</u> CHARGEABLE: | 10/5/90 to 10/6/90 in late September. |
| KSC-36 | OMS PODS | DI T | 7:47:15 AM EDT (A) Saturday 2 | Wednesday 3 10/10/90 (5) | 100/104/ 101/67/ | ET-39 | | OMS-2 160.2 X | | 46173 LBS | LAUNCH CCDUDC, None |
| 5.45 | LPO4 - 8 | PLT: Robert D. Cabana | 10/6/90 (5) | 10/10/90 (5) | 104/65 | E1-39 | | 150.2 A 159.5 NM | | | LAUNCH SCRUBS: None. |
| PAD 39B-10 | RPO1- 13 | P184/R113/M101 | 10/0/70 (3) | DEORBIT BURN : | 104/05 | <u>ET</u> | | 137.3 14141 | | DEPLOYABLE: 38604 LBS | LAUNCH DELAYS: |
| 39D-10 | FR | | LAUNCH WINDOW: | 283:13:00:05Z (150 Seconds | 1 = 2011 (6) | RPT | | <u>ULYSSES</u> | | | - 10M43S delay at T-9 minutes due to rain showers 14 |
| MLP-2 | C3 - 11 | M/S 1: | 2H17M | DV 286.6) | 2 = 2031 (4) | 239K | | DEPLOY 1/0 Y | | NON-DEPLOYED: | miles north of RTLS runway Countdown held at T-5 minutes for 10 seconds to mask |
| | | Bruce E. Melnick P185/R114/R102 | (ULYSSES UPPER STAGE | VDANCE: | 3 = 2107 (3) | 1:16:20 MET | | 160 X 159 NM | | 6732 LBS | GLS WSB 2 indication. |
| (Was STS 61-F) | | | PERFORMANCE) | XRANGE: 492 NM | | | | 13711111 | | MIDDECK: | - 1M22S delay at T-31 seconds due to P/L- Orbiter I/F and |
| | | <u>M/S 2</u> : | ′ | ORB DIR: DL 18 | M 3 EOM | <u>ET</u> | | POST SEP | | MIDDECK: 837 LBS | duct pressures out of limits. |
| | | Thomas D. Akers | LANDING SITE | | WEIGHT. | BR/UP 177K | | BURN | | SHUTTLE | - 12M15S total delay. |
| | | P186/R115/M103 | PRIORITIES: NOEM: | <u>aim PT</u> : Nom | WEIGHT: 196982 | 1:17:50 | | 177.9 X 160 NM | | ACCUMULATED | TAL WX: |
| | | M/S 3: | EDW Lakebed - | MLGTD: 2295 FT | 170702 | MET | | 100 14101 | | WEIGHTS: | - Banjul (prime) - Marginal WX, recent rain. |
| | | William M. Shepherd | Prime | 283:13:57:19Z VEL: 193 KGS | X CG: 1089.4 | | | <u>DEORBIT</u> | | DEPLOYED: 515171 LBS | - Ben Guerir (alt) selected - solid GO WX. |
| | | (Flt 2 STS-27) P187/R96/V56/M87 | RTLS: KSC 33 | 192 KFAS | LANDING | <u>ET</u> | | 162.4 X 151.4 NM | | NON-DEPLOYED: | LLOADS, LSEAT calcated naminal Lloads, no unlink |
| 20 | Sto | P187/R90/V30/IVI87 | KILS: KSC 33 | HDOT: -1 FPS | LANDING | <u>IMPACT</u> | | 131.4 IVIVI | | 407698 LBS | I-LOADS: LSEAT selected nominal I-loads, no uplink required. |
| HARL | AB | | TAL: Banjul | TD NORM 195: | WEIGHT: | LAT: | | VELOCITY | | CARGO TOTAL: | roquirou. |
| \$ N) | 1 2 | MCC FCR-1 (17) | | 2315 FT | 196869 | 12.52°N LONG: | | 25762 FPS | | 1042236 LBS | FIRSTS: |
| # / / | 43 | FLIGHT DIRECTORS: | TAL WX : Ben Guerir 36 | NLGTD: 6359 FT | X CG: 1091.2 | 164.1°W | | <u>RANGE</u> | | PERFORMANCE | - First flight with all 3 Orbiters in vertical; OV-103/STS-41 on pad B, OV-102/STS-35 on pad A, OV-104/STS-38 in |
| SE 180 | | A/E/O1 - R. D. Dittemore | (Selected) | 283:13:57:31Z | A CG. 1091.2 | 104.1 ** | | 4147 NM | | MARGINS (LBS): | VAB. |
| 200 | | Ld/O 2 - J. M. Heflin | ľ , | NLGTD: 6359 FT 283:13:57:31Z VEL: 154 KGS HDOT: -2.7FPS | CTC0/1 | 61-009 Uly | recor Do | played | | FPR: 4652 FUEL BIAS: 994 | - First flight after MPS LH2 leaks found in STS-35 and |
| C | The state of the s | Plng - G. E. Coen MOD - T. W. Holloway | <u>AOA</u> : NOR 17 | BRK INIT: 135 KGS | 313041- | ·01-009 01 | 72262 De | pioyeu | | FINAL TDDP: 1270 | STS-38. |
| SHI | COLLERD | MDR - R. M. Kelso | MAX Q = 665 | | | | | | | RECON: -152 | First flight using fixed (shimmed) GOX FCV's (step 1). First flight with SRB using redesigned field joint protection |
| | CP ALC. | WDR - R. W. RCISO | M = 00:49 MET | AVE BRK DECEL: 9 FPS/S | | | | | | PAYLOADS: | system. |
| | | | 200 250 | | | 1 | 6 . | | | PLB: | ENERGE STATES |
| | The Control of the Control | | SRB SEP: 2:06 MET | WHEELS STOP: 283:13:58:08Z 10827 FEET | | | 7 b | | | ULYSSES/IUS/ | EVENTS: - RMS parked at 1:03:35 MET with INTELSAT solar array |
| 100 mg | | | 2.00 IVIL I | 10827 FEET | | | 1 | | | PAM-S (SOLAR ORBIT) | coupon in velocity vector to witness potential solar array |
| Di Company | 0 | | MECO: | | | | | | | DEPLOYED | damage. |
| | 1 Dyon | Omotion | 8:28 MET | ROLLOUT: 8478 FEET 49 SECONDS | | | | | | CCDUV | - ULYŠSES deployed at 06:01:06 MET. - No entry blackout. |
| | | | ET SEP: | | | Land of Street | E-MIII | | | SSBUV ISAC | - No entry blackout Conducted RCS Hot Fire using extended firing durations |
| N. C. | 100 | | 8:46 MET | WINDS: | | KRE- | TO THE | 製 温暖 | | | (640 msecs) to attempt nitrate removal. |
| | | TOTAL TOTAL | | Light & Variable Peak 3 Kts | 100 | 1000 | | | | MID-DECK: CHROMEX | 0.0005. |
| | V | | OMS-1: None | WINDS: Light & Variable Peak 3 Kts 2.3H, 2 R KNOTS OFFICIAL: 2H, 2R | 1.2114 | W. | | | | VCS | SIGNIFICANT ANOMALIES: - MC4 (SM2) NBAT had GPC 2 assigned to FC string 3. |
| | | | None | OFFICIAL: 2H, 2R | 100.00 | | | Separation of the last | | SSCE | - IMU 1 RM fail (experiencing transient 2 axis |
| 56 | | | OMS-2: | DENS. ALT:1308 FT | | | | | | IPMP | accelerometer shifts). |
| | | | 39:53.3 MET | FLT DURATION: | | | 188 | | | PSE RME-III | - APU 1 GG/fuel pump heater B failed on. |
| 116 | 11 | | 144 Seconds (223.3 FPS) | 4:02:10:04 | | The last | 1 | | | AMOS | - Ammonia boiler PRI A controlled low, 31.6° evap out temp. |
| 30.5 | | | (223.3113) | 98:10:04 | | | | | | 3 CRYO TK SETS | - Hydraulic Sys #2 priority valve sluggish at startup. |
| STS041-24 | 007 1000 1 | 0-10 Crew in middeck | | <u>S/T</u> : 209:12:58:50 | | | 150 | | | | - Hydraulic Sys #2 priority valve sluggish at startup. - Debris plunger (EO-2) fail to seat/ ordnance pieces found |
| | | | | OV-103: | | | All and | 1.00 | Ц | RMS 22 (S.N. 301) | on runway Crescent shaped debris (22") in video camera views |
| | | ards & PLT Cabana; (rear | | 61:10:18:20 | S90-4761 | 5 FLT DIF | R's: left. M | ilt Heflin & | | Used for INTELSAT solar array coupon | during Ulysses deploy. |
| ,it. to rt.) AK | ers/ivis, ivielni | ck/MS, & Shepherd/MS. | | DISTANCE: | | Dittemore | 2 3 , 111 | | | (witness plate) | - Haz gas grab bottles indicated max 37,000 SCIM's during |
| | | | | 1,707,445 sm | 1.9/10/1 | | | | | exposure | ascent (upward trend). |

| | | | SPA | CE SHUT | TLE M | ISSI | ONS | S SUMI | MAI | ₹Y | Page 2-41 - STS-38 |
|--|--|--|--|---|---|---|-------------|--|--------------|--|---|
| FLT | ORBITER | CREW (5) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-38 SEQ FLT #37 KSC-37 PAD 39A-27 MLP-1 | OV-104 (Flight 7) Atlantis OMS PODS LPO1 - 13 RPO3 - 12 FRC4 - 7 | CDR: Richard O. Covey (Flt 3 - STS 51-I & STS-26) P188/R73/V34/M67 PLT: Frank L. Culbertson P189/R116/M104 M/S 1: Carle J. Meade P190/R114/M105 M/S 2: Robert C. Springer (Flt 2 - STS-29) P191/R98/V57/M89 M/S 3: Charles D. Gemar P192/R118/M106 | KSC 39A 319:23:48:15Z 6:48:15 PM EST Thursday 9 11/15/90 (7) PLS: EDW RTLS: KSC TAL: Banjul (Selected) TAL WX: Ben Guerir SELECTED: RTLS: KSC 15 TAL: BYD 32 AOA: EDW 22 MAX Q: 00:49 MET SRB SEP: 2:03 MET MECO: 8:29 MET ET SEP: 8:47 MET OMS-1: 10:30 MET OMS-2: 47:43 MET | KSC 33 (KSC 6) 324:21:42:42Z 4:42:42 PM EST Tuesday 8 11/20/90 (6) DEORBIT BURN: 324:20:46:15Z XRANGE:3 NM ORB DIR: DL 19 AIM PT: CLOSEIN MLGTD: 1414 FT 324:21:42:42Z VEL: 195 KGS 199 KAS HDOT: -1 FPS TD NORM 195: 1850 FT NLGTD: 4600 FT 324:21:42:52Z VEL:162 KGS HDOT: -3.1 FPS BRK INIT: 127 KGS AVE BRK DECEL: 7 FPS/S WHEELS STOP: 324:21:43:39Z 10417 FEET ROLLOUT: 9003 Feet 57 Seconds | 104/104/ 109% ACTUAL: 100/104/ 104/72/ 104/65 1 = 2019 (7) 2 = 2022 (5) 3 = 2027 (5) M 3 EOM WEIGHT: X CG: LANDING WEIGHT: 191091 X CG: 1098.6 | BI-039 RSRM 12 ET-40 LWT-33 ET RPT 222K 47:10 MET BR/UP 181K 47:56 MET ET IMPACT LAT: 28.52°S LONG: 84.9°W | 28.45° (23) | DEORBIT BURN 114.9 SECS 228.5 FPS DEORBIT 142 X 115 NM VELOCITY 25729 FPS ENTRY RANGE 4146 NM OMS BURN 114.9 SECS 228.5 FPS | OI-8D (2) | PERFORMANCE MARGINS (LBS): FPR: 4652 FPR: 4653 RECON: 474 SECONDARY PAYLOADS: APE VFT-1 RME-III AMOS APM S-BAND XPONDERS ON SRB'S | KSC W/D: OPF 134 (2), VAB 26 (3), PAD 85 (2) = 245 LAUNCH POSTPONEMENTS: - As of Jan 1990, launch date was 7/9/90. On 5/29/90, OV-102/STS-35 launch was scrubbed because of excessive H ₂ leak in aft compartment. Special H ₂ tanking tests were performed on OV-104/STS-38 6/18/90 - STS-38 rolled out to Pad A. Scheduled launch 7/9 6/29/90 - LH ₂ Tanking Test #1 - Excessive H ₂ leak detected in umbilical area 7/13/90 - LH ₂ Tanking Test #2 - Excessive H ₂ leak detected in umbilical and plate gap areas 7/25/90 - LH ₂ Tanking Test #3 - Excessive H ₂ leak ET 17" disconnect flange area. Decision made to roll back and fix leak 8/9/90 - Rolled stack back to VAB 8/15/90 - OV-104 to OPF. Umbilical removed from ET-37 and sent to MSFC and RI-D for tests. Subsequently, found follower arm seal and shaft seal leaks in tests. Decision to use ET-40 after replacing LH2 umbilical 10/13/90 - Rolled out to Pad A 10/24/90 - LH ₂ Tanking Test #4 successful Launch scheduled for 11/15/90. 129-day slip. LAUNCH DELAY; Launch delayed because Range Bermuda command link out of service. TAL WX: - Banjul - GO (weather good) Ben Guerir - GO (weather good) Due to seasonal slip in launch, pitch negative became pitch nominal , which LSEAT selected, and was uplinked (Uplink 4). |

MCC FCR-2 (20)

FLIGHT DIRECTORS: Asc/Ent - A. L. Briscoe O 1 - R. M. Kelso Ld/O 2 - C. R. Knarr Plng - C. W. Shaw MOD - B. R. Stone

<u>WINDS</u>: 4H, 4.4R KTS OFFICIAL: 4H, 4R DENS. ALT: 387 FT FLT DURATION: 4:21:54:27 117:54:27

> S/T: 214:10:53:17 <u>OV-104</u>: 33:16:43:40

DISTANCE: 2,045,056 sm



STS038-28-016 1990-11-20 Crew on Atlantis' middeck: (right to left) Springer/MS, PLT Culbertson, CDR Covey, Gemar/MS, and Meade/MS. First flight with Air Force, Navy, Army, and Marine Corps crewmembers. DOD Mission.

NIGHT LAUNCH: Fifth Shuttle night launch.

WAVEOFFS:

- Waved off on fourth day because of excessive head and crosswinds on all three landing opportunities at EDW.

- Extended one rev to land at KSC because of high winds predicted at EDW.

Continued . . .

| | | | | | | - | 3110 | | VI/ XI | <u> </u> | |
|------------|---------|-----------------------------|--|--|--|--------------------------|-------------|----------------|--------|---|--|
| FLT NO. | ORBITER | CREW (5) TITLE, NAMES | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, | SSME-TL NOM-ABORT EMERG THROTTLE PROFILE | SRB RSRM AND ET | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | & EVA'S | ADORT TIMES | WINDS | ENG. S.N. | C1 | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-38 | | | | | | | | | | | Continued |
| Continued | | | | | | | | | | | |
| | | STS-38: LAUNCH | | TY OF EARTH ptions Not Available | | LA1 | NDING | 9 | | | LANDING SITE CHANGE: - Changed from EDW to KSC landing because of predicted unfavorable winds. |
| sts038-9 | 02-077 | | | s38-82-093 38-78-090 s38-86-016 | | | | | | \$38-86-044 \$38-s041 | FIRSTS: - First flight with Air Force, Navy, Army, and Marine Corps crewmembers. All 4 hymns were used as wakeup music on one day First flight of GOX FCV's in step 2 position. SIGNIFICANT ANOMALIES: - WSB 2 not cooling on controller A FES water supply accumulator heater biased low Vacuum cleaner short, CB 29 opened CCTV monitor 2 fault light on - powered down APU 2 EGT and APU 2 and 3 injector tube temps interacting Right vent door 1 and 2 purge position dropped to closed position instead of purge position - RIU PC low Continuous 'Tire 'Press' FDA messages post landing Several smoke detectors had event indicators go high but not high enough to trigger alarm GPC mode switch found in STDBY and power switch in off. |

| | | | O 1 / | CE SHU | | | 0110 | | TI/AI | V I | |
|---|--|---|---|--|--|---------------------------------------|--|--|-------|---|---|
| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | (| ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-35 (STS 61-E) SEQ FLT #38 KSC-38 PAD 39B-11 MLP-3 | OV-102 (Flight 10) Columbia Fifth Spacelab Flight ASTRO-1 IGLOO + 2 PALLETS (2nd IGLOO) OMS PODS LPO3 - 10 RPO4 - 6 FRC2 - 10 | CDR: Vance D. Brand (Flt 3 - STS-5 & STS 41B) P193/R9/V4/M9 PLT: Guy S. Gardner (Flt 2 - STS-27) P194/R95/V58/M86 M/S 1: John M. Lounge (Flt 3 - STS 51-1 & STS-26) P195/R74/V35/M68 M/S 2: Jeffrey A. Hoffman (Flt 2 - STS 51-D) P196/R57/V59/M52 M/S 3: Robert A. R. Parker (Flt 2 - STS-9) P197/R27/V60/M26 P/S 1: Ronald A. Parise (CSC) P198/R119/M107 P/S 2: Samuel T. Durrance John Hopkins University P199/R120/M108 MCC FCR-1 (18) FLIGHT DIRECTORS: Asc/Ent - N. W. Hale Ld/O 1 - G. E. Coen O 2 - G. A. Pennington O 3 - R. E. Castle MOD - T. W. Holloway | Sunday 4 12/02/90 (2) LAUNCH WINDOW 2H30M (CTOB) RTLS: KSC-15 TAL: Banjul 32 TAL WX: Ben Guerir Moron SELECTED: TAL: BYD 32 RTLS: KSC 15 AOA: EDW 22 PLS: EDW22 AOA: EDW 22 PLS: EDW22 MAX Q: 696 PSF 00:50 MET SRB SEP: 2:06 MET MECO: 8:32 MET ET SEP: OMS-1: NONE | EDW 22 CONC (EDW 30,CONC 13) 345:05:54:09Z 9:54:09 PM PST Monday 9 12/10/90 (4) DEORBIT BURN: 345:04:48:31Z 230.5 SECS,383 FPS XRANGE: 426 NM ORB DIR: DL 20 AIM PT: CLOSEIN MLGTD: 1535 FT 345:05:54:09Z VEL: 208 KGS 201 KEAS HDOT: -1 FPS TD NORM 195: 2247 FT NLGTD: 5559 FT 345:05:54:20Z VEL:168 KGS HDOT: -3.9 FPS BRK INIT: 136 KGS AVE BRK DECEL: 7.2 FPS/S WHEELS STOP: 345:05:55:06Z 12101 FEET ROLLOUT: 10450 Feet 58 Seconds WINDS: 0.7 T, 0.7 R KTS OFFICIAL: 1T, 1R DENS ALT: 1143 FT FLT DURATION: 8:23:05:08 2/T: 223:09:58:25 OV-102: 65:23:00:04 DISTANCE: 3,728,636 sm | 104/104/ 109% 100/104/ 71/104/65 1 = 2024 (2) 2 = 2012 (11) 3 = 2028 (5) M 3 EOM WEIGHT: 225531 X CG: 1079.1 LANDING WEIGHT: 225329 X CG: 1080.5 | 's middec enter, CDF 6, Hoffmai | (24) 990-12- k, clocky R Brand, h/MS, Pl | DIRECT INSERTION INSERTION ALTITUDE: 190.4 X 188.2 NM DEORBIT 195.2 X 180.3 NM VELOCITY 25858 FPS ENTRY RANGE 4266 NM 11 Crew in wise from Parker/MS. LT Gardner, S. | (3) | CARGO: 33037 LBS CHARGEABLE: 27760 LBS DEPLOYED: 0 LBS NON-DEPLOYED: 25968 LBS MIDDECK: 1792 LBS RETURNED: SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 515171 LBS NON-DEPLOYED: 435458 LBS CARGO TOTAL: 1075273 LBS PERFORMANCE MARGINS (LBS): FPR: 4652 FUEL BIAS: 994 FINAL TDDP: 4131 RECON: 3812 PAYLOADS: PLB: ASTRO-1: IPS, HUT, WUPPE, UIT, BBXRT (ASTRONOMY) MIDDECK: AMOS SAREX-II UVPI 5 CRYO TK SETS NO RMS | LAUNCH POSTPONEMENT: - As of 1/90, launch date was 5/9/90. Post-poned to 5/30/90 due to P/L argon servicing, LO₂ system leak, and FCL coolant valve contamination (low flow). 21-day slip. LAUNCH SCRUBS: - Scrubbed 5/29/90 launch during tanking due to excessive H₂ leak in aft compartment Failed 6/6/90 special LH2 tanking test, excessive H₂ leak in aft compartment 6/13/90 - Rolled back from Pad A to VAB 6/15/90 - OV-102 to OPF. Both OV-102 and ET-35 LH₂ umbilicals sent to RI-D for special LH2 leak tests. R&R'ed ET-35 and OV-102 umbilicals (used OV-105 umbilical) 8/2/90 - Rolled out to VAB for restacking 8/9/90 - Rolled to Pad A Scheduled launch for 9/1/90 Scrubbed 9/1/90 launch before tanking because of BBXRT TLM problem. Rescheduled launch for 9/6/90 Scrubbed 9/6/90 launch during tanking due to H₂ leak in aft compartment. (Estimated 30,000 SCIM's/6000 PPM.) Replaced crushed PV6 detent cover seal on SSME 3 and recirc pump package before 9/17/90 scheduled launch Scrubbed 9/17/90 launch during tanking at L-7 hrs due to H₂ leak in aft compartment (4300 PPM). Rescheduled launch for 10/2/90 10/8/90 - Rolled to Pad B after STS-41 launch (did not hard down) 10/8-9/90 - Rolled back to VAB because of Tropical Storm Klaus threat. Replaced crushed PV5 detent seal in SSME 2 10/14/90 - Rolled to Pad B. MPS troubleshooting found several small H₂ leaks exceeding specs 10/30/90 - Instrumented LH₂ Tanking Test, successful with only 150 PPM concentration in aft compartment 12/2/90 - Launch successful on fifth launch attempt. 170-day launch slip 207-day total slip. |

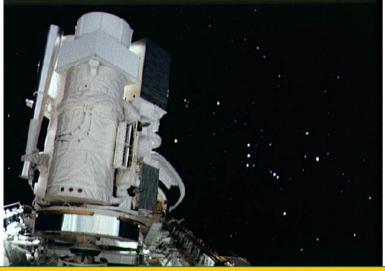
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
|-----|---------|--------------|----------------|---------------|-----------|------|-----|-------|-----|-------------|--------------------------------------|
| | | (7) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | RBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (7) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | α LVA 3 | | WINDS | ENG. S.N. | | | | | | |

STS-35

Continued



s35-13-008 -- Wisconsin Ultaviolet photo-Polarrimeter Experiment (WUPPE) on Spacelab pallet. The Broad Band X-Ray Telescope (BBXRT) is behind this pallet and is not visible.



STS035-28-022 1990-12-10 Astronomy Laboratory 1 (ASTRO-1) telescopes in the PL/Bay. At right is the Orion nebula. The three ultraviolet telescopes are mounted and coaligned on a common structure and attached to the Instrument Pointing System (IPS).



S88-54116 1988-11-30 Official insignia for the Johnson Space Center's (JSC's) Amateur Radio Club



S90-32048 1990-03-16 Shuttle Amateur Radio Experiment (SAREX) equipment held by R. Parise/PS at the JSC Full Fuselage Trainer. SAREX is used to conduct shortwave radio transmissions between ground amateur radio operators and a licensed onboard operator (in this case, Parise).



STS035-05-036 1990-12-11 STS-35 Commander Brand talks to family using SAREX on Columbia's middeck Continued ...

LAUNCH DELAYS:

- 21M1S delay while Range Safety had helicopter verify 8000 foot minimum optical coverage.

TAL WX:

- Weather good at Banjul and Ben Guerir.

I-LOADS:

- Launch delayed to new season and pitch negative became pitch nominal which LSEAT selected and was uplinked (uplink 5).

NIGHT LAUNCH: Space Shuttle #6.

NIGHT LANDING: Space Shuttle #4.

EVENTS:

- Most people in Earth orbit at the same time - 12 (7 Americans and 5 Soviets).

SIGNIFICANT ANOMALIES:

- FCL-1 degraded flowrate noticed before first launch attempt. Did not affect mission and performed as predicted.
- S/L DDS 1 (DDU) failed on FD1. Crew smelled smoke.
- S/L DDS 2 failed after 4 days. Crew smelled smoke. (Crew did IPS pointing and ground sent commands to operate experiments.)
- S/L subsystem computer failed due to a command problem caused by error in workstation program, recovered by IPL.
- Degraded waste water flow, virtual blockage at 152 hours.
 Filled CWC with 92 lbs, wastewater transferred to 15 female UCD's and 18 male UCD's.
- TAGS jam, TAGS tool broke.
- OPS 1 track 2 and OPS 2 track 5 problems.
- P/L recorder poor data quality.
- HDRR failed after 2 days of operations.
- Cameras B, C, & D problems.
- Several software patches were required to correct experiment/IPS target tracking.
- S-band UL and LR antenna problems.
- Several payload experiment problems.
- WSGT control computer failure.
- APU 2 lube oil pressure high during ascent & entry (wax formation caused by hydrazine contamination).
- No blackout during entry.

| | | | | LANDING SITE/ | SSME-TL | | | | | | |
|----------------------|-------------|--|--|------------------------------------|----------------------|-------------------------|---------|--|---------|-----------------------------------|--|
| | | CREW | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | (| ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (5) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, WINDS | PROFILE ENG. S.N. | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-37 | OV-104 | CDR: | KSC 39B | EDW 33, LAKEBED | 104/104/ | BI-042 | 28.453° | DIRECT | OI-8F | CARGO: | KSC W/D: OPF 97, VAB 6, PAD 22 = 125 days |
| 313-31 | (Flight 8) | Steven R. Nagel | 95.14.22.44 987 | (EDW 31, LKBD 18) | 109% | DI 042 | (25) | INSERTION | (1) | 40561 LBS | 100 WD. 011 77, VND 0,1 ND 22 - 123 ddys |
| SEQ FLT #39 | Atlantis | (Flt 3 - STS 51-G & STS 61-A) | 9:18:00 AM EST (P) 9:22:45 AM EST (A) | 5:55:29 AM PST | | RSRM | , , | INSERTION | () | PAYLOAD | <u>LAUNCH POSTPONEMENT:</u> |
| 024121#07 | | P200/R64/V23/M59 | Friday 6 | Thursday 2 | ACTUAL: | 14 | | ALTITUDE: | | CHARGEABLE: | - On 8/2/90, launch date was 3/27/91. |
| KSC-39 | | | 4/5/91 (7) | 4/11/91 (6) | 100/104/ | ET 27 | | 244.2 X | | 36800 LBS | - 4-day postponement prior to 10/90 (launch 4/1/91). |
| | | PLT: Kenneth D. Cameron | LAUNCH WINDOW: | XRANGE: 375 NM | 87/67/ 104/65 | ET-37 LWT-30 | | 241.2 NM | | NON-DEPLOYED: | - 7-day postponement in 11/90, STS-38 launch delay, launch date 4/8/91 (under review). |
| <u>PAD</u> 39B-12 | OMS PODS | P201/R121/M109 | 2H30M (CTOB) | ARANGE, 373 MM | 104/03 | LVV1 30 | | GRO DEPLOY | | 1615 LBS | - On 2/28/91, decision made to rollback STS-39 from pad |
| 39B-12 | LPO1 - 14 | M/S 1: | ` ′ | ORB DIR: AL 11 | 1 = 2019 (8) | <u>ET</u> RPT | | HO = 246.6 | | | to repair ET door hinge cracks. OV-104 ET doors |
| MLP-1 | RPO1 - 14 | Linda M. Godwin | <u>PLS</u> : EDW LKBD <u>TAL</u> : BANJUL <u>TAL ALT</u> : BEN | AIM PT: CLOSEIN | 2 = 2031 (5) | <u>RPT</u> | | NM | | DEPLOYABLE: 34442 LBS | repaired before OPF rollout. OV-103 rollback caused |
| IVIEI I | FRC4 - 8 | P202/R122/F13 | TAL ALT: BEN | Alivit I. CLOSLIN | 3 = 2107 (4) | 237K 1:22:20 | | | | 34442 LD3 | STS-39 to be launched after STS-37 At LSFR, launch date 4/4/91 (under review). |
| | | M/S 2: | | MLGTD:-623 FT | | MET | | | | MIDDECK: | - Postponed 1 day to 4/5/91 (tile and FRT). |
| | | Jerry L. Ross (Flt 3 - STS 61-B & STS-27) | SELECTED: RTLS: KSC 33 | 101:13:55:29Z VEL: 156 KGS | M 3 EOM | W.E. | | | | 743 LBS | - 9-day total slip from 8/90. |
| | | P203/R86/V38/M78 | TAL: BEN 36 | 168 KEAS | | <u>ET</u> | | | | <u>SHUTTLE</u> | |
| | | | <u>AOA</u> : EDW 22 | HDOT: -2 FPS | WEIGHT: | BR/UP | | | | ACCUMULATED WEIGHTS: | LAUNCH SCRUBS: None. |
| | | M/S 3: Jay Apt | TDEL: | TD NORM 195: | 190266 | 195K 1:23:25 | | DEORBIT | | DEPLOYED: | LAUNCH DELAYS: |
| | | P204/R123/M110 | | -2384 FT | X CG: 1087.4 | MET | | 248 X | | 549613 LBS | - 4M45S delay due to violation of RSO 8000-foot ceiling |
| | | EMU/TETHERED EVA:* | MAX Q: | NLGTD: 1200 FT | 7. 55. 155711 | | | 239 NM | | NON-DEPLOYED: 437816 LBS | requirement at T-9 and range "B LAST" prediction |
| | | EV1 - Jerry Ross | 676 681 | 101:13:55:35Z | <u>LANDING</u> | <u>ET</u> | | VELOCITY | | CARGO TOTAL: | (Counted to T-5 and held for waiver.) |
| | | EV2 - Jay Apt | 000 070 | VEL:130 KGS | WEIGHT | IMPACT | | <u>VELOCITY</u> 24612 FPS | | 1115834 LBS | TAL MANY |
| | | EVA 1 - 4/7/91 | <u>SRB STG</u> : 2:04 8 | HDOT: -8.4 FPS | WEIGHT: 190098 | <u>LAT</u> : 20.23°N | | ENTRY | | PERFORMANCE | TAL WX: - Banjul no go because of tail winds (brake energy). |
| | | SS EVA #14 3:40/4:32 | 2.0 1.0 | BRK INIT: 93 KGS | 170070 | LONG: | | RANGE | | MARGINS (LBS): | - Ben Guerir 36 go (selected). |
| | | SS UNSCHED EVA #2 | <u>PERF</u> : NOM | AVE DDK DECEL | X CG: 1089.2 | 149.3°W | | 4175 NM | | FPR: 4652 | |
| | | RELEASE STUCK GRO | 2 ENG TAL (BEN) | AVE BRK DECEL: 4.8 FPS/S | | | | | | FUEL BIAS: 994 FINAL TDDP:1116 | RTLS: |
| | | HI GAIN ANTENNA | 2:59 2:58 | | | | -0.00 | | . A 188 | RECON: 525 | - Forecast NO GO RW & ceiling, observed NO GO at T- 22 mins. Selected KSC NOM 33. |
| | | EVA 2 - 4/8/91 | NEG RETURN: | WHEELS STOP: 101:13:56:25Z | | | 4 | | | PAYLOADS: | 22 ITIIIIS. Selecteu KSC NOW 55. |
| | | SS EVA #15 5:47/5:57 | | 5741 FT | 0 | 70 | *** | | W | PI B· | I-LOADS: |
| | | DEMO SPACE STATION | | | | | | | | GAMMA RAY | - LSEAT select nominal I-loads, no uplink required. |
| | | (CREW & EQUIPMENT | <u>PTA</u> : 4:46 4:42 | ROLLOUT: 6364 FEET | | 5 | 20 | | | OBSERVATORY (GRO) DEPLOYED | FURLIT BURNTION OUTLINES |
| | | TRANSLATION AID) | | 56 SECS | | | | | | ÀPM ´ | FLIGHT DURATION CHANGES: - EDW 15 was first priority. Waved off one rev then |
| | | | <u>PTM</u> : 5:51 5:45 | WINDS: | 100.00 | 1 | | AL. | | CETA | extended flight 1 day due to winds/turbulence. |
| A COL | ANZ | | 5:51 5:45 | <u>WINDS</u> : 14.1H, 9.6 R KTS | 7 | 1 8 | | ê 🔥 📉 | | MIDDECK: | - Extended one rev due to winds at EDW. Extension |
| 1 | | | MECO CMD: | OFFICIAL: 15H, 8R | 100 | ΦΩ | | ACE TO DESTRUCTION OF THE PARTY | 100 | PCG. BLOCK II | total, 1 day + 1 rev. |
| | 15 B) | | 8:34 8:33.3 | <u>DENS. ALT</u> : 1732 FT | STS | -37 | | OBSERVATORY DELIVERY CO. | 1000 | RME-III SAREX | CDO DEDLOV 2.00.14.02 MET |
| ğ | Be | | VI: | | | | Star 1 | Ÿ | | AMOS | GRO DEPLOY: 2:08:14:02 MET Unscheduled EVA to release GRO antenna. |
| E | S S | | 26 010 26005 | <u>FLT DURATION</u> : 5:23:32:44 | | | | | | BIMDA | Onscheduled EVA to release one unterma. |
| 10 | W AS | | OMS-2: | 143:32:44 | STS037- | 30-024 | 1991-04 | -11 STS-37 | | 3 CRYO TK SETS | FIRSTS: |
| | PT | | Tig = DV=369 FPS | S/T: 229:09:31:09 | | | | Back row: C | פחי | | - First flight of new GPC's (AP-101S). |
| | | | DV=369 FPS | <u>311</u> . 227.07.31.09 | | | | Front row, le | eft | RMS 23 (S.N. 303 USED FOR | - First flight of OI-8F. - First EVA since STS 61-B on 12/01/85. |
| | | | | <u>OV-104</u> : | to right: F | | | | | GRO DEPLOY) | - 1 II 31 E VM 3IIIUC 313 01-0 011 12/01/03. |
| | | 0 | | 39:16:16:24 | | | | ronauts' "AC | Έ | ONO DEI EOT | Continued |
| | | Continued | | DISTANCE: | Moving C | | | | | | |
| * TWO EVA TI | MES ADE DOC | VIDED: (1) OLD DEFINITION | STADTED WILLIAM EN | 2,487,075 sm | • | | | TO ORBITER PO | W/ED | | |

TWO EVA TIMES ARE PROVIDED: (1) OLD DEFINITION - STARTED WHEN EMU WENT TO BAT POWER AND ENDED WHEN SWITCHED TO ORBITER POWER (2) NEW DEFINITION - STARTS WHEN EMU GOES TO BAT POWER AND ENDS WHEN AIRLOCK REPRESS STARTS

RSRM

AND

ET

ORBIT

HA/HP

INC

SSME-TL

NOM-ABORT

EMERG

THROTTLE

PROFILE

LANDING SITE/

RUNWAY,

CROSSRANGE

LANDING TIMES

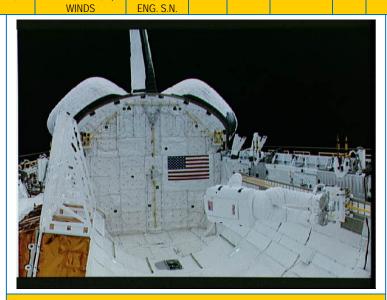
FLT DURATION,

| FLT NO. | ORBITER | CREW (7) TITLE, NAMES | LAUNCH SI LIFTOFF TII LANDING SI ABORT TIN | ME, TES, |
|------------------|---------|--|---|-------------|
| STS-37 Continued | | & EVA'S Continued MCC FCR-1 (19) FLIGHT DIRECTORS: Asc/Ent - N. W. Hale Ld/O 1 - C. W. Shaw | | |
| | | O 2 - J. M. Heflin Plng - P. L. Engelauf MOD - G. E. Coen | | |

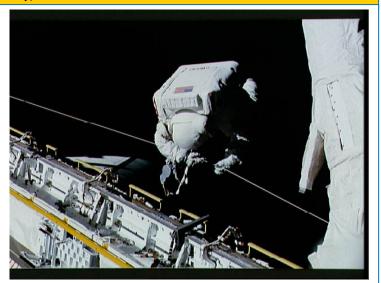


STS037-99-089 1991-04-11 Deployed Gamma Ray Observatory (GRO) over Baja California, Mexico (31.5N, 113.0W), the Salton Sea and Imperial Valley region of California where the mouth of the Colorado River empties into the Sea of Cortez are clearly visible.

At Right: STS037-55-012 1991-04-11 Ross/MS drifts outside P/L Bay as he attaches a tether to a port side guidewire during EVA.



TOP: STS037-52-013 1991-04-11 Apt/MS, suited in Extravehicular Mobility Unit (EMU), tests Crew and Equipment Translation Aid (CETA) electrical hand pedal cart during EVA in P/L Bay).



Continued ...

PAYLOAD

WEIGHTS,

PAYLOADS/

EXPERIMENTS

FSW

SIGNIFICANT ANOMALIES:

- Thruster R1U failed off 32 seconds after MECO.
- WSB 2A temporary spray bar freeze up during ascent.

MISSION HIGHLIGHTS

(LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS,

FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

- WSB 2A and 3A lube oil overcooling during entry.
- PRSD O2 manifold valve failed to close.
- EVA glove palm bar penetrated restraint and glove bladder.
- Prelaunch BFS navigation anomaly.
- Ku-band antenna erratic in ant mode.
- EMU-1 failed to charge battery post EVA-1.
- Abnormal O₂ concentration in aft compartment (220 PPM)
- Unscheduled EVA required to deploy GRO high gain antenna.
- Scheduled EVA.

| FLT NO. | ORBITER | CREW (7) TITLE, NAMES & EVA'S | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, | SSME-TL NOM-ABORT EMERG THROTTLE PROFILE | SRB RSRM AND ET | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
|--|---|---|---|--|---|--|--------------------|---|--------------|--|---|
| STS-39 SEQ FLT #40 KSC-40 PAD 39A-28 MLP-2 | OV-103 Discovery (Flight 12) OMS PODS LPO4 - 9 RPO3 - 13 FRC3 - 12 | CDR: Michael L. Coats (Fit 3 - STS 41-DR & STS-29) P205/R38/V39/M37 PLT: L. Blaine Hammond P206/R124/M111 M/S 1: Gregory J. Harbaugh P207/R125/M112 M/S 2: Donald McMonagle P208/R126/M113 M/S 3: Guion S. Bluford (Fit 3 - STS-8 & STS 61-A) P209/R22/V25/M21 M/S 4: Charles Lacy Veach P210/R127/M114 M/S 5: Richard J. Hieb P211/R128/M115 MCC FCR-1 (20) FLIGHT DIRECTORS: Asc/Ent - A. L. Briscoe Ld/O2 - R. D. Dittemore O 1 - R. E. Castle | MAX Q: | BRK INIT:136 KGS AVE BRK DECEL: 9.5 FPS/S | ENG. S.N. 104/104/ 109% ACTUAL: 100/100/ 94/70/ 104/67 1 = 2026 (1) 2 = 2030 (5) 3 = 2029 (4) M 3 EOM WEIGHT: 211673 X CG: 1080.3 LANDING WEIGHT: 211512 X CG: 1082.0 DEORBIT 140 X 138 NM VELOCITY 25765 FPS | BI-043 RSRM 15K ET-46 LWT-39 ET RPT 249K 1:09:34 MET ET BR/UP 275K 1:10:34 MET ET IMPACT LAT: 43.82°S LONG: 156.3°W | 57.007° (7) | DIRECT INSERTION INSERTION ALTITUDE: 140.02 X 138.22 NM SPAS DEPLOY: 137.37 X 136.55 NM CRO-C DEPLOY: 136.4 X 134.7 NM CRO-B DEPLOY: 135.5 X 132.7 NM SPAS RNDZ: 135.5 X 132.8 NM CRO-A DEPLOY: 140.96 X 138.6 NM MPEC DEPLOY: 141.55 X | OI-8F (2) | CARGO: 26294 LBS PYLD CHARGABLE: 21413 LBS DEPLOYABLE: 827 LBS NON-DEPLOYED: 16046 LBS RETURNED: MIDDECK: 494 LBS SHUTTLE ACCUM WEIGHTS: DEPLOYED: 550440 LBS NON-DEPLOYED: 454356 LBS CARGO TOTAL: 1142128 LBS PERFORMANCE MARGINS (LBS): FPR: 4653 FUEL BIAS: 994 FINAL TDDP:1054 RECON: 2768 PAYLOADS: PLB: Infrared Background Signature Survey (IBSS) (SPAS-II (IV) | KSC W/D: OPF 116 (2), VAB 17 (3), PAD 47 (2) = 180 LAUNCH POSTPONEMENTS: - As of 8/21/90, launch date is 2/26/91 2/26/91 launch postponed to 3/9/91 due to OMS pod work. (Swapped RP-03 from OV-104 for RP-01.) - On 2/15/91, cracks found in OV-103 ET door hinge brackets. On 2/28/91, decision made to roll back and repair ET doors resulting in STS-39 launch being scheduled after STS-37. Launch rescheduled for 4/23/91 56 days total slip based on 8/21/90 schedule. LAUNCH SCRUBS: - 4/23/91 launch scrubbed at L-6 hours due to SSME #3 HPOTP secondary seal pressure xducer problem and P/L servicing. Rescheduled launch for 4/28/91 5-day slip. (Total slip - 61 days.) LAUNCH DELAYS: - 32M14S delay caused by review of OPS 2 recorder uncommanded switching of tracks and going to run at approximate time of BFS 101 PRO. TAL WX: - Zaragoza and Moron no go - ceilings (broken < 8000 feet). LICADS: - LSEAT selected nominal, no uplink. FLIGHT DURATION/LANDING SITE CHANGES: - Landed at KSC on same rev as planned for EDW because unfavorable winds predicted at EDW. |
| 039-07-017 | | O 3 - R. M. Kelso MOD - T. W. Holloway rew On-Orbit | NEG RETURN: 4:06 4:08 PTA: (ATO) 4:56 5:10 PTM: 6:09 6:22 VI: 25804 25850 OMS-2: Tig =36:08 DV=209.6 FPS | 126:18:56:31 9403 FT ROLLOUT: | ENTRY RANGE 4502 NM | Shuttle F | Pallet Sated Backg | 139.46 NM 991-05-06, ellite II (SPAS round Signatu eased by RMS | re | + 3 GAS DEPLOY CRO-A, CRO-B, CRO-C, CIV) AF-675 (CIRRIS, FAR-UV, URA, HUP, QINMS) STP-1 (ALFE, APM, SKIRT, UVIM, DSE) MPEC - GAS DPLY MIDDECK: CLOUDS-1A RME-III UVPI 4 CRYO TK SETS RMS 24 (S.N. 301) USED FOR SPAS/IBSS DPLY, CAPTURE, AND BERTH | EVENTS: - SPAS deploy - rev 46, SPAS RNDZ - rev 72, MPEC deploy - rev 127 16 OMS burns. RENDEZVOUS 9: With Infrared Background Signature Survey (IBSS) (SPAS-II) for retrieval and return. FIRSTS: - First flight with 67% as standard 3g throttling. SIGNIFICANT ANOMALIES: - ROB tire outboard shoulder damaged during landing (3 cords) OPS 2 recorder uncommanded switching of tracks and tape speed prelaunch FES feedline A system 2 heater failure APU 2 fuel pump/GGVM coolant sys A valve did not operate GFE tread mill excessive resistance. |

| | | | OI F | ICL SITU | | | 0110 | OOM | иді | <u> </u> | |
|--|--|--|--|--|---|--|--------------------------------|--|--------------|--|--|
| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | (| ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | ORBITER | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | 1300 | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-40 SEQ FLT #41 KSC-41 PAD 39B-13 MLP-3 | OV-102 Columbia (Flight 11) Sixth Spacelab Flight LM (4) First Life Sciences Flight | CDR: Bryan D. O'Connor (Flt 2 - STS 61-B) P212/R83/V61/M76 PLT: Sidney M. Gutierrez P213/R129/M116 M/S 1: James P. Bagian (Flt 2 - STS-29) P214/R99/V62/M90 | KSC 39B 156:13:24:51Z 8:00:00 AM EDT (P) 9:24:51 AM EDT (A) Wednesday 5 6/5/91 (4) LAUNCH WINDOW: 2H00M (MAND SLS-1 SCIENCE) PLS: EDW LKBD TAL: BEN GUERIR TAL ALT: | EDW 22, CONC (EDW 32, CONC 14) 165:15:39:11Z 8:39:11 AM PDT Friday 5 6/14/91 (3) XRANGE: 211 NM ORB DIR: DR 6 AIM PT: NOMINAL MLGTD: 1485 FT 165:15:39:11Z | 104/104/ 109% PREDICTED: 100/100/ 92/67/ 104/67 ACTUAL: 100/100/ 98/71/ 104/67 1 = 2015 (6) | BI-044 RSRM 16W ET-41 LWT-34 ET RPT 244K 1:19:40 MET | 39.0156° (1) | DIRECT INSERTION POST OMS-2: 161.16 X 149.84 NM | OI-8D (4) | CARGO: 33707 LBS PAYLOAD CHARGEABLE: 28114 LBS DEPLOYED: 0 LBS NON-DEPLOYED: 26237 LBS RETURNED: | KSC W/D: OPF 74, VAB 6, PAD 34 = 114 days LAUNCH POSTPONEMENT: - 1/9/91 launch date as of 8/21/90. Launch order was STS-35, STS-41, STS-38, STS-40, STS-39, and STS-37. Launch postponed due to STS-35 and STS-38 H₂ leaks. Program manifest in March set tentative schedule of 5/22/91 with STS-37 and STS-39 moved ahead of STS-40 129-day slip. LAUNCH SCRUBS: - 5/22/91 launch scrubbed at approximately L-1 day (during T-11 hr hold) due to (1) MDM FA2 problem, (2) GPC4 failure, and (3) SSME cryo temp probes analysis |
| 513 10 10 10 10 10 10 10 10 10 10 10 10 10 | OMS PODS LPO3 - 11 RPO4 - 7 FRC2 - 11 | M/S 2: Tamara E. Jernigan P215/R130/F14 M/S 3: Rhea Seddon (Flt 2 - STS 51-D) P216/R55/V63/F5 P/S 1: F. Drew Gaffney P217/R131/M117 P/S 2: Millie Hughes-Fulford U of Cal/VA Center | MORON ZARAGOZA SELECTED: RTLS: KSC 33/CI/N TAL: BEN 36/N//N AOA: EDW 22 PLS: EDW 22 TDEL: -0.32 +0.402 | VEL: 199 KGS 203 KEAS HDOT: -2 FPS TD NORM 195: 2202 FT NLGTD: 5914 FT 165:15:39:25Z VEL: 153 KGS HDOT: -4 FPS BRK INIT: 134 KGS AVE BRK DECEL: 6.8 FPS/S WHEELS STOP: | M 3 EOM WEIGHT: 226737 X CG: 1279.6 LANDING WEIGHT: 226535 X CG: 1080.9 | ET BR/UP 197K 1:20:52 MET ET IMPACT LAT: 1.05°N LONG: 146.06°W | | DEORBIT 157 X 146 NM VELOCITY 25772 FPS ENTRY RANGE 4339 NM | | MIDDECK: 1877 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 550440 LBS NON-DEPLOYED: 482470 LBS CARGO TOTAL: 1175835 LBS PERFORMANCE MARGINS (LBS): FPR: 4671 FUEL BIAS: 983 | received stating probes could break and enter HP turbopumps. Changed LO ₂ and LH ₂ temperature transducers. Launch rescheduled for 6/1/91. 10-day turnaround. - 6/1/91 launch scrubbed at T-20 minute hold due to IMU 2 failing calibration. 96-hour turnaround. LAUNCH DELAYS: - 1H24M51S delay at T-9 minute hold due to RSO no-go for ceiling at 12K. (Moisture in middle clouds and greater than 4500 feet thick.) TAL WX: - Ben Guerir (P) go throughout (selected). - Moron go throughout - Zaragoza go. |
| STS040-6 1991-06-1 Spacelab L Sciences-1 P/L Bay | 4 ife | P218/R132/F15 MCC FCR-1 (21) FLIGHT DIRECTORS: Asc/Ent - N. W. Hale Ld/O2 - G. A. Pennington O 1 - R. E. Castle Plng - J. W. Bantle MOD - B. R. Stone | PERF: NOMINAL 2 ENG TAL: 2:57 3:01 NEG RETURN: 4:02 4:03 PTA: 5:15 5:18 PTM: 5:45 5:49 MECO CMD: 8:31.2 8:30.4 | 165:15:40:06Z 10923 FT ROLLOUT: 9438 FT 55 SECONDS WINDS: 10.4H, 6 L KTS OFFICIAL: 12H, 3L DENS ALT: 3739 FT FLT DURATION: 9:02:14:20 218:14:20 S/T: 246:19:07:50 OV-102: 75:01:14:24 DISTANCE: 3,290,226 sm | Crew: Fro | ont row (It , Seddon/ (It to rt) C | to rt) Ga MS, & B DR O'C | | | FINAL TDDP:3037 RECON: 4212 PAYLOADS: PLB: Spacelab Life Sciences-1 (SLS-1)/LM Cardiovascular, Cardiopulmonary Metabolic, Musculoskeletal, and Neurovestibular Systems Experiments GBA With 12 GAS MIDDECK: MODE-0 5 CRYO TK SETS NO RMS | RTLS: - KSC 15/33 ceiling 12K with middle clouds thicker than 4500 ft caused delay. -LOADS: - LSEAT selected nominal, no uplink required. SIGNIFICANT ANOMALIES: - Two ECOS failures Hum sep A speed sensor wire break PRSD H2 tank 3 heater failure MECO velocity error (explained condition) KSC wind tower data false wind gusts S-band degraded performance on lower antennas TAGS hardcopier jam PLBD seal section missing and 1307 bulkhead blankets unfastened LiOH door stuck closed (IFM freed door) Camcorder adapter cable failure APU 1 fuel line heater failure Vernier jet L5L fail off S/L audio problem Orbiter freezer and L9I ref/freezer Freon freezeup. |

| | | | SP F | ICE SHU | | MIOOI | CIAS | | VIAI | 7 I | Page 2-49 - 515-43 |
|--------------|---|-----------------------|--------------------------------|-------------------------------------|-------------------|---------------------|----------|--|------------------|-------------------------|---|
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
| | | (5) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | (| ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (5) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | & EVA S | | WINDS | ENG. S.N. | | | | | | |
| STS-43 | OV-104 | CDR: | KSC 39 | KSC-15 (KSC-8) | 104/104/ | BI-045 | 28.46° | DIRECT | OI-20 | CARGO: | KSC W/D: OPF 60, VAB 6, PAD 35 = 101 days |
| 010 10 | (Flight 9) | John E. Blaha | 214:15:02:00Z | 223:12:23:25Z | 109% | | (26) | INSERTION | (1) | 49325 LBS | |
| SEQ FLT #42 | Atlantis | (Flt 3 - STS-29 | 11:02:00 AM EDT (P) | | | RSRM | ` ´ | | . , | 5.0.0.0.0 | LAUNCH POSTPONEMENT: |
| 3LQ1L1#42 | | & STS-33) | 11:02:00 AM EDT(A) | 6:23:25 AM EDT | PREDICTED: | 17W | | 158/35 | | PAYLOAD | - 7/23/91 launch postponed on 7/19/91 to 7/24/91 due to |
| KSC-42 | | P219/R97/V48/M88 | Friday 7 | Sunday 6 | 100/104/ | | | | | CHARGABLE: 46712 LBS | SRB sep motor PIC wire replacement. |
| K3C-42 | | | 08/02/91 (5) | 08/11/91 (3) | 80/67/104 | ET-47 | | POST OMS-2: | | 40/12 LBS | |
| PAD | | PLT: | LALINGLLWINDOW | VDANCE, 100NM | | LWT-40 | | 161.3 X | | DEPLOYED: | LAUNCH SCRUBS: |
| 39A-29 | OMS PODS | Michael A. Baker | LAUNCH WINDOW: 2H30M (CTOB) | XRANGE: 180NM | ACTUAL: | | | 160.3 NM | | 37575 LBS | - 7/24/91 launch scrubbed at approximately L-6 hours |
| MLP-1 | LPO1 - 15 | P220/R133/M118 | ZH30W (CTOB) | ORBIT DIR: DL 22 | 100/104/ | <u>ET</u> RPT | | | | | (during tanking) due to SSME 3 MEC DCU "A" parity error, |
| IVILP-1 | RPO1 - 15 | | PLS: KSC | ORDIT DIK. DL 22 | 84/67/104 | <u>RPT</u> | | <u>TDRS</u> | | NON-DEPLOYED: | MCF was set. Launch rescheduled for 8/1/91. |
| | FRC4 - 9 | <u>M/S 1</u> : | TAL: BANJUL (P) | AIM PT: CLOSE IN | | 234K | | DEPLOY: | | 8146 LBS | - 8/1/91 launch scrubbed at L+1H24M while holding at T-9 |
| | | Shannon W. Lucid | TAL WX: | | 1 = 2024 (3) | 1:17:35 | | 161.2 X | | MIDDECK. | min. Did not get cabin vent close indication but counted |
| . A | - | (Flt 3 - STS 51-G | BEN GUERIR | MLGTD: 1986 FT | 2 = 2012(12) | MET | | 159.8 NM | | MIDDECK: 991 LBS | down to T-20 and ran cabin pressurization test (valve was |
| - 6 | | & STS-34) | MORON | 223:12:23:25Z | 3 = 2028 (6) | | | | | 771 LD3 | closed) but by the time cabin was vented and cabin closed |
| <u> </u> | | P221/R65/V45/F6 | | VEL: 202 KGS | | ET | | OMS SEP | | SHUTTLE | out, WX at KSC was bad. Scrubbed because T-showers |
| | | | SELECTED: | 197 KEAS | <u>M 3 EOM</u> | BR/UP | | MAN: | | ACCUMULATED | within 20 nm, Xwinds > 15 kts @ SLF & convection |
| | | <u>M/S 2</u> : | RTLS: KSC 15/CI/N | HDOT: -1 FPS | | 186K | | 177.9 X | | WEIGHTS: | present. Rescheduled launch for 8/2/91. 10 days total slip. |
| | | G. David Low | <u>TAL</u> : BEN 36/N/N | TD NORM 195: | WEIGHT: | 1:18:15 | | 161.2 NM | | DEPLOYED: | |
| | | (Flt 2 - STS-32) | AOA: EDW 22/N/N | 2152 FT | 196353 | MET | | | | 588015 LBS | LAUNCH DELAYS: None. |
| BLAHA | BAKER LOW | P222/R110/V64/M98 | <u>PLS</u> : EDW 22/N/N | | | ГТ | | <u>DEORBIT</u> | | NON-DEPLOYED: | |
| ADAM. | SON 5 | | TDEL: | NLGTD:5517 FT | X CG: | <u>ET</u> IMPACT | | 174 X | | 491607 LBS | TAL WX: Ben Guerir and Moron go, Banjul late go after |
| | | <u>M/S 3</u> : | | 223:12:23:36Z | 1087.4 | LAT: | | 161 NM | | CARGO TOTAL: | T-showers and ceiling no go. Selected BEN 36. |
| | | James C. Adamson | 0.00 0.302 | VEL: 165 KGS HDOT: -2.7 FPS | | 13.47°N | | | | 1225160LBS | |
| | | (Flt 2 - STS-28) | MAX QNAV: | | LANDING: | LONG: | | VELOCITY 25704 FDG | | PERFORMANCE | I-LOADS: LSEAT selected nominal, no uplink required |
| | | P223/R102/V615M93 | 714 PSF 718PSF | BRK INIT: 132 KGS | WEIGHT: 196088 | 162.2°W | | 25794 FPS | | MARGINS (LBS): | (uplink 6). |
| Artist conce | ept TDRS Co | omm Network | | | X CG: | 102.2 W | | ENTRY | | FPR: 4653 | FIRSTS: First flight of OI-20. |
| | 120 | | SRB STG: 2:04.3 2:02.9 | AVE BRK DECEL: 6.1 FPS/S | 1089.7 | | | RANGE | | FUEL BIAS: 994 | FIRSTS. FIIST HIGHT OF OF-20. |
| | | | 2:04.3 2:02.9 | 0.1113/3 | 1009.7 | | | 4312 NM | | FINAL TDDP:2656 | SIGNIFICANT ANOMALIES: |
| 2.00 | 10 | 100 | | WHEELS STOP: | | | | 4312 14141 | | RECON: 2593 | - Cabin vent valve failed to indicate "closed." |
| | 0//0 | | PERF: NOM | 223:12:24:24Z | | | | | | | - No cooling on WSB2 during ascent. |
| (4) | A S | * | 2 ENG TAL BEN: | 11876 FT | | | | | | PAYLOADS: | - PDI decom problems with SHARE data. |
| 1 | | | 3:13 3:12 | ROLLOUT: | | | - | Yes rails | | PLB: TDRS-E/IUS | - PRSD H ₂ tank 1 heater failed off. |
| | - F. S. | | 3.13 | 9890 FT | | | | | | SSBUV | - APU 1 FP/GGVM overcooling. |
| | Mizz | 20 | NEG RETURN: | 59 SEC | 1 | 2 | 10 | | | SHARE-II | - S-band power amp 2 degradation. |
| | 2000 | 78 | 3:53 3:54 | | 1 1 | | | | | OCTW | - PPO ₂ sensor "C" failed. |
| S90-4 | 1340 1990-0 | 6-22 | | WINDS: | 3,1 | | 91 | | | TCPE | - APU 1 S/N 305 anomalous chamber pressure during |
| | | | PTA (U/S 245): | 0.5T, 4R KTS | | | 一 | | \mathbf{y}_{n} | | entry. |
| Section 1 | A . Pet | MCC FCR-1 (22) | 5:13 5:09 | OFFICIAL: 0T, 3R | | | 12 | The state of the s | | MIDDECK: | - PLB floodlight problems, mid-STBD RPC trip. |
| | 200 | FLIGHT DIRECTORS: | DT1.4 (1.1/0.0.45) | DENS ALT: 1602 FT | -11 | | | | | SSCE | - BIMDA cell syringe problems. |
| | | Asc - R. D. Dittemore | PTM (U/S 245): 5:50 5:49 | ELT DUDATION | F | | 6. | | 1 | SAMS | - PRSD tank H ₂ manifold valve failed to close. |
| | | Ent - J. W. Bantle | 5:50 5:49 | <u>FLT DURATION</u> : 8:21:21:25 | | | | The state of the | | BIMDA IPMP | |
| 012 0000 | | Ld/O 1 - R. M. Kelso | MECO CMD: | 213:21:25 | 1 | 1 | | | | PLG-III | DISCUSSION ITEM: |
| | (5) | O 2 - P. L. Engelauf | 8:27.7 8:27.6 | | | 1 | 3 100 | | | UVPI | - LIB MLG tire rib 2 tire wear (scuffing of two cords). |
| 357 | W. V. | Plng - G. E. Coen | 0.27.0 | <u>S/T</u> : 255:16:29:15 | | | | | 100 | AMOS | |
| STS043-60 | 01- 033 | Plng - J. M. Heflin | VI: | OV 104: | | | | | | APE-B | |
| 1991-08-1 | | MOD - T. W. Holloway | <u>VI</u> : 25875 25873 | <u>OV-104</u> : 48:13:37:49 | STS042 | 10-020 10 | 01_08_1 | 1 Crew or | , | 5 | |
| TDRS-E/IU | | MOD - G. E. Coen | | | | | | S, Lucid/MS, | ' | 4 CRYO TK SETS | |
| over Pacific | | MDR - B. R.Stone | OMS-2 TIG: | DISTANCE: | | | | | | | |
| Over 1 delli | J 500011. | MDR - J. M. Heflin | 39:50.09 222.2 FPS | 3,700,400 sm | Adamson | /IVIO, CDF | k Biana, | & PLT Bake | ar. | NO RMS | |

| | | | OI F | ICE SHU | | VIIOOI | OIAC | | AIVI | V I | Page 2-50 - 515-46 |
|----------------------------------|--|---|--|--|---|---|---------------------|---|--------------|---|---|
| FLT | ORBITER | CREW (5) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM- ABORT EMERG | SRB RSRM | (| ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-48 SEQ FLT #43 KSC-43 | OV-103 (Flight 13) Discovery | CDR: John O. Creighton (Flt 3 - STS 51-G, & STS-36) P224/R63/V50/M58 | KSC 39A 255:23:11:04Z 6:57:00 PM EDT (P) 7:11:04 PM EDT (A) Thursday 10 9/12/91 (2) | EDW 22 NOM (EDW 33,CONC 15) 261:07:38:42Z 00:38:42 AM PDT Wednesday 4 09/18/91 (4) | 104/104/ 109% PREDICTED: 100/100/ 89/67/ | BI-046 RSRM 18W ET-42 | 57.00° (8) | DIRECT INSERTION 288 X 36 NM | OI-20 (2) | CARGO: 21564 LBS PAYLOAD CHARGABLE: 17144 LBS | KSC W/D: OPF 78, VAB 8, PAD 27 = 101 days LAUNCH ADVANCEMENT: - Launch advanced 9 days from 9/21/91 to 9/12/91, which was the earliest date to complete crew training |
| PAD 39A-30 MLP-3 | OMS PODS LPO4 - 10 RPO3 - 14 FRC3 - 13 | PLT: Kenneth S. Reightler P225/R134/M119 M/S 1: James F. Buchli (Flt 4 - STS 51-C, STS 61-A, & STS-29) P226/R52/V24/M48 | LAUNCH WINDOW: 2H57M (UARS RAAN & CTOB) PLS: KSC TAL: ZARAGOZA TAL ALT: MOR, BEN SELECTED: RTLS: KSC33/NOM NOM 2400 FT | XRANGE: 690 NM ORBIT DIR: DR 7 AIM PT: NOMINAL MLGTD: 1235 FT 261:07:38:42Z VEL: 213 KGS 203 KEAS HDOT: -1 FPS | 104/67 ACTUAL: 100/100/ 89/67/ 104/67 1 = 2019 (9) 2 = 2031 (6) 3 = 2107 (5) | ET RPT 229K 1:25:46 MET ET BR/UP | | POST OMS-2: 291.5 X 289.9 NM RCS-1: 306.9 X 290.9 NM RCS-2: 308.1 X | | DEPLOYED: 14388 LBS NON-DEPLOYED: 2066 LBS MIDDECK: 690 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: | LAUNCH SCRUBS: None. LAUNCH DELAYS: - 14M4S because of motor boating noise on A/G voice caused by glitch on RF to MILA resulting in Delta Modulation System (DMS) false frame lock. Counted to T-5 mins, held and cleared by CDR keying A/G voice. TAL WX: Zaragoza, Moron, and Ben Guerir - all go. DOLILU/ALT I-LOADS: - First availability of DOLILU which was uplinked and |
| CREIGH | TON CRAME OF THE PARTY OF THE P | M/S 2: Mark N. Brown (Flt 2 - STS-28) P227/R103/V66/M94 M/S 3: Charles D. (Sam) Gemar (Flt 2 - STS-38) P228/R118/V67/M106 MCC FCR-1 (23) FLIGHT DIRECTORS: Asc/Ent - J. W. Bantle Ld/O1 - G. A. Pennington O 2 - R. M. Kelso Plng - P. L. Engelauf MOD - G. E. Coen | MAX Q NAV: 670 708 SRB STG: | TD NORM 195: 2015 FT NLGTD: 4882 FT 261:07:38:53Z VEL: 171 KGS HDOT: -2.1 FPS BRK INIT: 145 KGS AVE BRK DECEL: 8.2 FPS/S WHEELS STOP: 10619 FT ROLLOUT: 9384 FT 49 SECS | M 3 EOM WEIGHT: 192925 X CG: 1096.0 LANDING: WEIGHT: 192780 X CG: 1097.8 | 194K 1:26:47 MET <u>ET</u> IMPACT LAT: 0.26°N LONG: 121.9°W | | 207.9 NM <u>UARS</u> <u>DEPLOY</u> : 308.9 X 305.3 NM <u>ENTRY</u> : Ha/Hp: 313 X 302 NM <u>VELOCITY</u> 26077 FPS <u>RANGE</u> 4194 NM | | 602403 LBS NON-DEPLOYED: 494363 LBS CARGO TOTAL: 1246729 LBS PERFORMANCE MARGINS (LBS): FPR: 4671 FUEL BIAS: 983 FINAL TDDP: 510 RECON: - 562 PAYLOADS: PLB: Upper Atmosphere Research Satellite (UARS) with 10 experiments | used (uplink 7). DUSK LAUNCH: - Launch was planned during daylight but 14 minute delay slipped to dusk launch, RTLS would have been night. FLIGHT DURATION CHANGES: - Waved off planned rev at KSC because STA observed clouds developing south of SLF Flight extended one rev when STA spotted clouds forming south of SLF. Clouds were not observed on radar. FIRSTS: - First flight of enhanced MDM (OA1 only). LANDING SITE CHANGE: - Changed from KSC to EDW because of the dynamic |
| | | 1-09-18 Upper th Satellite (UARS) | NEG RETURN: 4:09 4:14 PTA (U/S 518): 4:23 4:23 PTM (U/S 1124): 6:44 6:50 MECO CMD: 8:36 8:36 | WINDS: 2.9H, 0.8 L KTS OFFICIAL: 4H, 4L DENS ALT: 3503 FT FLT DURATION: 5:08:27: 38 128:27:38 S/T: 261:00:56:53 OV-103: 75:02:08:19 DISTANCE: 2,193,670 sm | middeck: | (front It to , Buchli/N | rt) PLT IS and (| 8 Crew on Reightler, Co back It to rt | EDR | deployed: SUSIM, SOLSTICE, PEM, CLAES, ISAMS, MLS, HALOE, HRDI, WIND II, ,ACRIM-II, APM MIDDECK: PCG-II-2 RME-III MODE IPMP AMOS PARE SAM CREAM 4 CYRO TK SETS RMS 25 (S.N. 301) used for UARS deploy | conditions with clouds and convection observed by STA. One rev extension. EVENTS: UARS deployed at MET 2:05:12:09. SEP 1 burn at 2:05:12:40. NIGHT LANDING: Space Shuttle #5 SIGNIFICANT ANOMALIES: ET door centerline latch 1 motor 2 phase B failure. Fuel cell 1 O2 reactant valve closed indication. Supply water dump valve leaking. Hydraulic system 2 unloader valve leakage. Supply water nozzle temperature temporary decrease. APU 1 seal cavity drain pressure delay. LINHOF camera failed. |

| | | | | CE SHU | | | 0140 | COMI | | X I | |
|---------------------------------|---|---|---|---|--|--|---------------------------------------|---|--------------|--|---|
| FLT | ORBITER | CREW (6) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | (| ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | STUTE | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-44 SEQ FLT #44 KSC-44 | OV-104 (Flight 10) Atlantis | CDR: Frederick D. Gregory (Flt 3 - STS 51-B & STS-33) P229/R59/V47/M54 | KSC 39, PAD A 328:23:44:00Z 6:31:00 PM EST (P) 6:44:00 PM EST (A) Sunday 6 11/24/91 (8) | EDW 05 (EDW 34, LKBD 19) 335:22:34:43Z 2:34:43 PM PST Sunday 7 12/1/91 (5) | 104/104/ 109% PREDICTED 100/104/ 104/67 | BI-047 RSRM 19W ET-53 | 28.45° (27) | DIRECT INSERTION POST OMS-2 195.0 X 194.3 NM | OI-20 (3) | CARGO: 47235 LBS PAYLOAD CHARGEABLE: 44637 LBS | KSC W/D: OPF 67, VAB 5, PAD 31 = 103 days LAUNCH POSTPONEMENTS: - As of 8/21/90, launch date was 7/5/91. - Postponed launch date to 11/15/91 caused by STS-38 and STS-35 H ₂ leaks. Postponed to 11/19/91 due to STS-43 delays impacted MLP availability and WLE tee |
| <u>PAD</u> 39A-31 MLP-1 | OMS PODS LPO1-16 RPO1-16 FRC4-10 | PLT: Terence (Tom) Henricks P23/0R135/M120 M/S 1: James S. Voss P231/R136/M121 M/S 2: F. Story Musgrave (Fit 4 - STS-6, STS 51-F & STS-33) P232/R15/V19/M15 | LAUNCH WINDOW 1H59M (DSP RAAN) EOM PLS: KSC TAL: BYD 32 TAL WX: BEN , MRN SELECTED: RTLS: KSC 33/CI/N TAL: BYD 32/IV/SF AOA & PLS: EDW 22/IV/N | XRANGE: 379 NM ORBIT DIR: AL 12 AIM PT: CLOSEIN MLGTD: 2607 FT 335:22:34:43Z VEL: 182 KGS 189 KEAS HDOT: -1 FPS | 104/67 <u>ACTUAL</u> 100/104/ 104/73/ 104/67 1 = 2015 (7) 2 = 2030 (6) 3 = 2029 (5) | ET RPT 235K 1:19:55 MET ET BR/UP 207K 1:20:38 MET | | DEPLOY: 195.5 X 194.9 NM SEP BURN: 212.4 X 195.4 NM RCS-2 195.9 X 195.3 NM | | DEPLOYED: 37588 LBS NON-DEPLOYED: 5809 LBS MIDDECK: 1240 LBS SHUTTLE ACCUMULATED WEIGHTS: | SIS-43 delays impacted MLP availability and wile tee splice replacement. LAUNCH SCRUB: - Scrubbed 11/19/91 launch at T-9 hours because one IMU in IUS RIMU experienced BITE indications. Rescheduled launch for 11/24/91 to replace IUS RIMU. 5-day slip. 142 days total slip. LAUNCH DELAYS: - 11/24/91 launch was delayed 13M0S at T-9 minutes to torque down packing in a leaking LO ₂ replenish valve and to avoid a COLA at 6:38 pm EST. |
| Wedga Ave 4 | A VOSS | M/S 3: Mario Runco, Jr P233/R137/M122 P/S: Thomas J. Hennen CWO-3, U.S. Army P234/R138/M123 MCC FCR-1 (24) FLIGHT DIRECTORS: Asc/Ent - R.D.Dittemore Ld/O 2 - J. M. Heflin | TDEL: -0.16 0.442/0.48 MAX ON: 719 PSF 728 PSF SRB STG: 2+05 2+05 PERF: NOM 2 ENG TAL BYD: 2+41 2+40 | NLGTD: 5077 FT 335:22:34:51Z VEL: 149 KGS HDOT: -5.2 FPS BRK INIT: 15 KGS AVE BRK DECEL: 1.8 FPS/S WHEELS STOP: 335:22:36:29Z | M 3 EOM WEIGHT: 195047 X CG: 1090.8 LANDING WEIGHT: 194818 X CG: 1092.5 | ET IMPACT LAT: 17.01°N LONG: 154.05°W | | COLLISION AVOIDANCE 195.9 X 195.0 NM DEORBIT 197 X 194 NM VELOCITY 25868 FPS ENTRY RANGE 4195 NM | | DEPLOYED: 639991 LBS NON-DEPLOYED: 501412 LBS CARGO TOTAL: 1293964 LBS PERFORMANCE MARGINS (LBS): FPR: 4356 FUEL BIAS: 1337 FINAL TDDP: 565 RECON: 1025 | TAL WX: Banjul (prime) and Ben Guerir were go. Moron predicted no go (ceiling) but was observed go. ALT I-LOADS: - Second flight with DOLILU capability. Nominal selected. No uplink required. NIGHT LAUNCH: Shuttle night launch #7. LANDING SITE CHANGE: Loss of one IMU caused MDF and lakebed landing, hence changed to EDW from KSC. FLIGHT DURATION CHANGES: |
| | | O 1 - P. L. Engelauf Plng - C. W. Shaw MOD - T. W. Holloway | PTM (U/S 315): 5+57 6+00 MECO CMD: 8+28.5 8+30 VI: | <u>DENS ALT</u> : 2284 FT <u>FLT DURATION</u> : 6:22:50:43 166:50:43 | "Trash Ma onboard vi (front row) | n" Hennen/ deo on dis CDR Greg It to rt) Rui | PS (front posal of t ory (left) | rew: featuring ctr) star of rash. Others & Voss/MS ar Musgrave/MS | nd | PLB: DEFENSE SUPPORT PROGRAM (DSP)/IUS (DEPLOYED) IOCM MIDDECK: MSS-1 AMOS CREAM SAM RME-III VFT-1 TERRA-SCOUT UVPI 4 CRYO TK SETS NO RMS | - Extended one rev at EDW because of predicted high winds Flight shortened nearly 3 days due to IMU 2 failure. FIRSTS: - First flight of HAINS ALT IMU (IMU-1 only) First flight of color CCTV monitors. SECOND SHUTTLE CREWMEMBER REPLACEMENT: David Walker was replaced by Gregory in 1990. (First Shuttle crewmember replacement occurred on STS-33.) SIGNIFICANT ANOMALIES: - Left SSME MCC P Xducer B BIAS ~30 PSIA high Supply water dump valve leaking after water dump HUMIDITY SEP B leaking water IMU 2 FAIL (Z AXIS ACCEL) - caused MDF and lakebed landing Left AIR DATA PROBE single motor deploy VCR tape door problem TREADMILL failed 16 mm ARRIFLEX malfunctioned APU 2 FUEL PUMP seal cavity drain line valve failure. |

| | | | FACE 311 | | | 1100 | | 17 41 4 1 | | | 1 age 2-32 - 313-42 |
|--|--------------------|---|--|----------------------------------|------------------------------|-----------------------------------|-------------|------------------|-----------|------------------------------------|---|
| | | CREW | | LANDING SITE/ | SSME-TL | 000 | | ODDIT | | 544,645 | |
| EL T | ODDITED | (7) | LAUNCH SITE, | RUNWAY, CROSSRANGE | NOM-ABORT | SRB RSRM | | ORBIT | ECM | PAYLOAD | MISSION HIGHLIGHTS |
| FLT NO. | ORBITER | ` ' ' | LIFTOFF TIME, | LANDING TIMES | EMERG THROTTLE | AND | INC | HA/HP | FSW | WEIGHTS, PAYLOADS/ | (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS. |
| NO. | | TITLE, NAMES | LANDING SITES, ABORT TIMES | FLT DURATION, | PROFILE | ET | IINC | HAVHP | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | & EVA'S | ADOINT HIMLS | WINDS | ENG. S.N. | LI | | | | LAI LINIVILIVIS | TIKSTS, SIGNII ICANT ANOMALIES, ETC.) |
| STS-42 | OV-103 | CDR: | KSC 39, PAD A | EDW 22 | 104/104/ | BI-048 | 57° | DIRECT | OI-20 | CARGO: | KSC W/D: OPF 75, VAB 6, PAD 24 = 105 days |
| 010 12 | (Flight 14) | Ronald J. Grabe | 22:14:52:33Z | (EDW 35,CONC 16) 30:16:07:17Z | 109% | DCDM | (9) | INSERTION | (4) | 32364 LBS | LAUNOU DOCTDONEMENTS |
| SEQ FLT #45 | Discovery | (Flt 3 - STS 51-J & STS-30) | 8:53:00 AM EST (P) 9:52:33 AM EST (A) | 8:07:17 AM PST | PREDICTED | RSRM 20W | | POST OMS-2 | | PAYLOAD | LAUNCH POSTPONEMENTS: - As of 12/19/90, launch date was 11/15/91. |
| | Seventh | P235/R76/V41/M70 | Wednesday 6 | Thursday 3 | 100/100/ | | | 162 NM X 160 | | CHARGEABLE: | Postponed to 1/13/92 as of 3/15/91, 26-day slip. |
| KSC-45 | Spacelab | PLT: | 01/22/92 (5) | 01/30/92 (4) | 100/70/ | ET-52 | | NM | | 28663 LBS | - Postponed to 1/22/92 as of 8/21/91. 9-day slip. |
| D.4.D. | Long Module (5) | Steven S. Oswald P236/R139/M124 | LAUNCH WINDOW | XRANGE: 536 NM | 104/67 | LWT-45 | | | | DEPLOYED: | - 35 days total launch slip. |
| PAD 39A-32 | ` ′ | M/S 1 (P/L CDR): | 2H49M (EOM/ | | <u>ACTUAL</u> | <u>ET</u> | | | | 0 LBS | LAUNCH SCRUB: None. |
| MLP-3 | OMS PODS | Norman E. Thagard | TAL LIGHTING) | <u>Orbit dir</u> : Ar 3 | 100/100/ | <u>ET</u> <u>RPT</u> 243K | | | | NON DEDLOVED | LAUNGUERELAVO |
| IVILI -3 | LPO4-11 RPO3-15 | (Flt 4 - STS-7, " STS 51-B, STS-30) | PLS: EDW | <u>aim PT</u> : Nominal | 100/75/ 104/67 | 1:09:33 | | | | NON-DEPLOYED: 26453 LBS | LAUNCH DELAYS: - 1/22/92 Jaunch was delayed 59M33S at T-9 minutes |
| | FRC3-14 | P237/R20/V14/M19 | TAL: ZZA (P) | | | MET | | DEORBIT 160 X | | | - 1/22/92 launch was delayed 59M33S at T-9 minutes caused by: (1) Paper closure of FC2 H ₂ Pump/AC ₂ Bus anomaly, (2) KSC field mills read >1 KVOLT/meter |
| | | M/S 2: | TAL WX: MŔN, BEN | MLGTD: 2835 FT | 1 = 2026 (2) | | | 160 X 157 NM | | MIDDECK: 2210 LBS | anomaly, (2) KSC field mills read >1 KVOLT/meter |
| | | William F. Readdy P238/R140/M125 | SELECTED: | 30:16:07:17Z VEL: 198 KGS | 2 = 2022 (7) 3 = 2027 (7) | <u>ET</u> <u>BR/UP</u> 222K | | 157 INIVI | | 22 IU LBS | (determined to be caused by salt fog), (3) Excessive O ₂ in mid-body, (4)"BLAST" program violation, and (5) KSC field mills read >1 KVOLT/meter (STA confirmed |
| | | M/S 3: | RTLS: KSC 33/N/N | 196 KEAS | ` ' | 222K | | <u>VELOCITY</u> | | <u>SHUTTLE</u> | field mills read >1 KVOLT/meter (STA confirmed |
| | | David C. Hilmers | TAL: ZZA 30/CI/N AOA: N/A | HDOT: -1.5 FPS | M 3 EOM WEIGHT: | 1:10:08 MET | | 25785 FPS | | ACCUMULATED WEIGHTS: | moisture in cloud passing over field mills). |
| MEDS | S TP. | (Flt 4 - STS 51-J, STS-26, STS-36) | PLS: EDW 22/N/N | <u>TD NORM 195</u> : | 218159 | IVIEI | | FNTRY | | WEIGHTS: DEPLOYED: | TAL WX: Zaragoza (prime), Moron, and Ben Guerir |
| TO HIT HE | THAGARD | P239/R77/V36/M71 | (REV 3) | 2868 FT | X CG: | ET | | ENTRY RANGE | | 639991 LBS | forecast and observed GO. |
| W COM | * 188 | P/S 1: Roberta L. Bondar | ÈDW 04/CI/N (REV 7) | NLGTD: 5901 FT | 1080.6 | IMPACT | | 4358 NM | | NON-DEPLOYED: 530075 LBS | LAKEBEDS: EDW and NOR lakebeds NO GO (WET for |
| NOON | OLL OLL | (Canada) | (KEV /) | 30:16:07:27Z | LANDING | <u>LAT</u> : | | | | CARGO TOTAL: | LAKEBEDS. EDW and NOR lakebeds NO GO (WET 101 L&L). |
| REST | a Line | P240/R141/F16 | TDEL: | VEL: 168 KGS | WEIGHT: | 44.7°S | | | | 1326328 LBS | , |
| DDY GRA | BE OSWI | P/S 2: Ulf D. Merbold | 0.00 0.562/0.6 | HDOT: -4.3 FPS | 218089 X CG: | <u>LONG:</u> 157.9°W | | | | <u>PERFORMANCE</u> | ALT I-LOADS: - Nominal selected. No uplink required. |
| | | (Germany) | MAX QN: | BRK INIT: 133 KGS | 1082.2 | | | | | MARGINS (LBS): | - Normhai Selected. No upilitik required. |
| | | (Flt 2 - SŤS-9) | 692 PSF 708 PSF | | | | | | | FPR: 4339 | FLIGHT DURATION CHANGE: |
| | | P241/R29/V68/M28 | SRB STG: | AVE BRK DECEL: 6.3 FPS/S | | | | | | FUEL BIAS: 1394 FINAL TDDP:2511 | - Flight extended 1 day from 7 to 8 days to get additional Spacelab science data. |
| | | MCC FCR-1 (25) | 2+06.6 2+08 | | | | | | | RECON: 2716 | Spaceiau science data. |
| | | ` ' | | WHEELS STOP: | | | | | | | LANDING SITE CHANGE: None. |
| | | <u>FLIGHT DIRECTORS</u> : Asc/Ent - N. W. Hale | PERF: NOMINAL | 30:16:08:16Z 12676 FT | 4 | | = | | | <u>PAYLOADS</u> : PLB: | SIGNIFICANT ANOMALIES: |
| STS042-2 | 01-000 | Ld/O 2 - R. E. Castle | 2 ENG TAL ZZA: | | ZA SIE | | the distant | | | INTERNATIONAL | - MIDDS computer not transferring all winds data to |
| | B At work in | O 1 - J. W. Bantle | 2+51 2+48 | ROLLOUT: 9841 FT | | 1900 | | | $ \prec $ | MICROGRAVITY | FDCF. |
| | ndar (left) 8 | O 3 - C. W. Shaw MOD - T. W. Holloway | NEG RETURN: | 59 SEC | | 7 | 70 | | | LABORATORY MATERIALS | FC2 H₂ motor status/AC glitch prelaunch. MVI CB trip during pitch operations. |
| Oswald. | ridar (icit) d | inob 1. W. Honoway | 4+05 4+05 | WINDS: | | | 7 | | | SCIENCE AND | - Waste water dump rate degraded. |
| oomaid. | | | DTA (LI/C 200). | H 0.4 KTS | | der | | | | LIFE SCIENCES EXPERIMENTS | - White Sands central computer failure WCS commode control valve linkage failure. (IFM to |
| A CONTRACTOR OF THE PARTY OF TH | | CARRIED A CONTRACTOR | PTA (U/S 290): 5+20 5+10 | R 2.0 KTS | Sant D | | | | 4 | (IML-1/LM) | use vice grips to open/close) |
| 1 Sugar | | | | OFFICIAL: 1H, 2R | 7-147 | | | | - | GBA (12 GAS) | use vice grips to open/close.) - TAGS jam/imaging failure GAS can G-609 motorized door did not open. |
| | | | PTM (U/S 290): 5+52 5+42 | DENS ALT: 670 FT | | - | | | 1 | MIDDECK: | - GAS can G-609 motorized door did not open WCCSfailures and battery shortened life |
| | A CONT | | 3+32 3+42 | FLT DURATION: | T | | | | - 3 | MIDDECK: GOSAMR-1 | - RCS jet L3A fail leak (oxidizer). |
| | | | MECO CMD: | 8:01:14:44 | 1600 | | | | | SE 83-02 | - Crew reported plume from right pod, powered up MDM FA4 and confirmed R4U oxidizer leak. |
| A P | PART | | | 193:14:44 | 123 | | | | | SE 81-9 IPMP | FA4 and confirmed R4U oxidizer leak. - SRB - Gas path in RH & LH nozzle-to-case joint |
| NO THE RESERVE AND ADDRESS OF THE PERSON OF | | | VI: | <u>S/T</u> : 276:01:02:20 | STS042-3 | 35-011 19 | 92-01-3 | 0 Crew porti | rait | RME-111 | polysulfide with eroded wiper O-ring. |
| | 2 | | 25934 25928 | | in IML-1: | Top row (| It to rt) | Merbold/PS, | | UVPI | polysulfide with eroded wiper O-ring. - ET - two large TPS divots on the ET intertank. |
| | | | OMS-2 TIG: | <u>OV-103</u> : 83:03:23:03 | CDR Gra | be. Than | ard/MS | & Bondar/P | S: | 4 CRYO TK SETS | Radiators Deployed #13 |
| | OF STREET | | 36+12.8 36+08 | | | | | T Oswald, | , | | nadiators Deployed # 15 |
| 1=1 | | | | DISTANCE: | Hilmers/N | | | | | NO RMS | |
| | | | | 3,349,830 sm | | | | | | | |

| | | | SFA | CE SHU | | | CIAO | SOIVIII | | V I | Fage 2-33 - 313-45 |
|--|--|-------------------------|---|---|--|--|---|---|---------|--|---|
| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | (| ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | ORBITER | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | 1300 | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-45 SEQ FLT #46 KSC-46 PAD 39A-33 MLP-1 | OV-104 (Flight 11) Atlantis Eighth Spacelab Flight (2 Pallets) IGLOO (3) OMS PODS LPO1-17 RPO1-17 FRC4-11 | CDR: | | VEL: 161 KGS | 104/104/ 109% PREDICTED 100/100/ 89/74/ 104/67 ACTUAL: 100/100/ 89/74/ 104/67 1 = 2024 (4) 2 = 2012(13) 3 = 2028 (7) M 3 EOM WEIGHT: 205672 LBS X CG: 1085.4 LANDING WEIGHT: 205588 LBS X CG: 1087.2 | BI-049 RSRM 21W ET-44 LWT-37 ET RPT 249K 1:10:00 MET ET BR/UP 219K 1:10:50 MET ET IMPACT LAT: 42.7° LONG: 155.0°W | (10) | DIRECT INSERTION POST OMS-2 159.8 X 153.0 NM OMS-3: (CIRC BURN) 12.5 FPS @ 2:50:13 MET 160.5 X 159.3 NM DEORBIT 159.5 X 151.8 NM VELOCITY 25785 FPS ENTRY RANGE 4231 NM | | CARGO: 20341 LBS PAYLOAD CHARGABLE: 17683 LBS DEPLOYED: 0 LBS NON-DEPLOYED: 15538 LBS MIDDECK: 2145 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 639991LBS NON-DEPLOYED: 547758 LBS CARGO TOTAL: 1346669 LBS PERFORMANCE MARGINS (LBS): FPR: 4671 FUEL BIAS: 983 FINAL TDDP:11017 RECON: 10427 | KSC W/D: OPF 55, VAB 6, PAD 27 = 88 days LAUNCH POSTPONEMENTS: - Launch date was 3/10/92 as of 3/15/91. Postponed to 3/14/92 on 8/21/91. 4 days slip Postponed to 3/23/92 on 1/23/92. 9 days slip with decision made to launch during a full moon. LAUNCH SCRUB: - 3/23/92 launch was scrubbed at L-5.5 hours (fast fill + 3.5 minutes) because of H₂ and O₂ concentrations in aft compartment exceeding LCC limits (LH₂=750 PPM & LO₂=850 PPM). Could not repeat leaks during troubleshooting but scrubbed launch because could not make launch window. LAUNCH DELAYS: - 13M40S delay at T-9 minutes because of RTLS ceiling violations (cloud deck at approximately 6K feet). BLAST violations occurred during hold period. TAL WX: Zaragoza and Moron weather was GO, Moron was NO GO for runway margins, and Ben Guerir NO GO for weather (ceiling). ALT I-LOADS: - LSEAT selected YAW NEG, which was uplinked (uplink 8). DOLILU was NO GO because of greenline exceedance. |
| | | | NEG RETURN: 4:11 4:13 PTA (U/S 285): 4:16 4:13 PTM (U/S 285): 4:48 4:51 MECO CMD: 8:30.9 8:31 VI: 25830 25823 | WINDS: H 5.1 KTS L 3.2 KTS OFFICIAL: 5H, 3L DENS ALT: 224 FT FLT DURATION: 8:22:09:26 214:09:26 S/T: 284:23:11:46 OV-104: 64:10:37:58 | Flight Decl & CDR Bo Leestma/M | c: In front a olden. In re IS, PLT Du S, & Foale/ | re Sulliva ar are (It ffy, Lichte MS. (The | enberg/PS, e "headpieces' | rd sft) | PAYLOADS: PLB: ATLAS-1: ATMOPHERE SCIENCE: ALAE, MAS, ISO, ATMOS, GRILLE, SSBUV/A SOLAR SCIENCE: ACR, SOLCON, SOLSPEC, SUSIM SPACE PLASMA SCIENCE: AEPI, SEPAC, ENAP ASTRONOMY: FAUST GAS G-229 MIDDECK: STL-01, RME-III, VPT-2, CLOUDS-1A, SAREX-2, IPMP, UVPI 4 CRYO TK SETS NO RMS | FLIGHT DURATION CHANGE: - 3/29/92 MMT made decision that consumables supported an extension from 8+2 days to 9+2 days to get more science. FIRSTS: - First flight of an improved APU (APU 2 only) First flight with a female flight director (Linda J. Ham). SIGNIFICANT ANOMALIES: - Fuel Cell 3 cell performance monitor D volts remained at self test value Ku-Bd power output TLM intermittent fail Ku-Bd auto track problem, similar to STS-37 CCTV cameras A & C degraded TAGS OHC jam, cleared by crew APU 1 GG bed heater B intermittent Arriflex camera operate lever intermittent SEPAC electron beam accelerator operations were terminated on day 2 because 30 amp fuse between SEPAC battery and charger blew Lost all power to FAUST. |

| | | | SPA | CE SHU | | 11001 | ONS | | /I/AI | X I | Fage 2-34 - 313-49 |
|----------------------|---------------------|---|--|---|------------------------------|---------------------------|----------|------------------------------|-------|---|---|
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
| | | (7) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | (| ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | | | WINDS | ENG. S.N. | | | | | | |
| STS-49 | OV-105 | CDR: | KSC 39, PAD B | EDW 22 CONC | 104/104/ | BI-050 | 28.32° | DIRECT | 01-21 | CARGO: | KSC W/D: OPF 217, VAB 6, PAD 49=272 days |
| | (Flight 1) | Daniel C. Brandenstein | 128:23:39:59.98Z | (EDW 36,CONC 17) | 109% | DCDM | (1) | INSERTION | (1) | 37444 LBS | LAUNCH DOCTDONEMENTS |
| SEQ FLT #47 | Endeavour | (Flt 4 - STS-8, STS 51-G & STS-32) | 7:06:00 PM EDT (P) 7:40:00 PM EDT (A) | 137:20:57:39Z 1:57:39 PM PDT | PREDICTED | RSRM 22K | | POST OMS-2 | | PAYLOAD | LAUNCH POSTPONEMENTS: - Launch date was 4/16/92 as of 3/21/91. |
| KSC-47 | | P249/R21/V16/M20 | Thursday 11 | Saturday 8 | 100/104/ | ZZIN | | 182.5 X | | CHARGEABLE: | - Postponed launch to 4/30/92, then 5/4/92 on 4/23/92 at |
| N3C-47 | | | 5/7/92 (2) | 5/16/92 (4) | 89/72/ | ET-43 | | 139.8 NM | | 32809 LBS | FRR because of sheer volume of work including aft ET |
| PAD | | PLT: | | | 104/67 | LWT-36 | | | | DEDLOVED. | attach point liner repair. |
| <u>PAD</u> 39B-14 | OMS PODS | Kevin P. Chilton P250/R145/M129 | LAUNCH WINDOW | DEORBIT BURN: | ACTUAL | гт | | INTELSAT | | DEPLOYED: 23346 LBS | - Postponed launch to 5/7/92 to allow a daylight launch. |
| MLP-2 | LPO3-12 RPO4-8 | | 47 Minutes (in 2 panes) | 137:19:55:15Z | ACTUAL 100/104/ | ET RPT | | RNDZ: 198 X | | 23340 LD3 | - 21-day total slip. |
| | FRC5-1 | M/S 1, EV2: | (III 2 paries) | XRANGE: 411 NM | 89/73/ | 238K | | 194 NM | | NON-DEPLOYED: | LAUNCH SCRUB: None. |
| | 11001 | Richard J. Hieb | EOM PLS: EDW | THU HVOE. TITTINI | 104/67 | 1:16:47 | | 17111111 | | 8766 LBS | <u>LIGHOIT GORGE</u> . Notice |
| | | (Flt 2 - STS-39) P251/R128/V70/M115 | TAL: BYD | ORBIT DIR: AL 14 | | MET | | ORBITS: | | MIDDECK: | LAUNCH DELAYS: |
| N BRANDE | ENSTEIN | | TAL WX: BEN | AIM DT. NOMINIAL | 1 = 2030 (7) | гт | | 46, 62, & 95 | | MIDDECK: 697 LBS | - Launch delayed because of RTLS ceiling violations (5K- |
| E SO | TEE. | M/S 2: | SELECTED: | <u>aim Pt</u> : Nominal | 2 = 2015 (8) 3 = 2017 (6) | <u>ET</u> <u>BR/UP</u> | | | | | - Launch delayed because of RTLS ceiling violations (5K-7K bkn), then TAL WX (BYD NO GO visibility/haze, BEN NO GO occasional 4K bkn and rain). MEC BITE indication |
| 6 | DI S | Bruce E. Melnick (Flt 2 - STS-41) | RTLS: KSC 33/CI/N | MLGTD: 2156 FT | 3 - 2017 (0) | 206K | | DEORBIT | | SHUTTLE | and an aircraft in launch area. Counted to T-9 minutes then |
| = (1) | 2 | P252/R114/V71/M102 | TAL: BEN 36/CI/N | 137:20:57:39Z | | 1:17:45 | | 195 X | | ACCUMULATED WEIGHTS: | T-5 minutes. Switched to second pane of launch window |
| E CORROLL | 2 | | AOA: EDW 22/N/N | VEL: 209 KGS | M 3 EOM | MET | | 184 NM | | DEPLOYED: | and uplinked new launch and OMS target loads. |
| 4 | - L | M/S 3, EV1: | <u>PLS</u> : EDW 22/N/N | 194 KEAS | WEIGHT: | | | , (E) O O (E) (| | 636337 LBS | - 34-minute total delay. |
| THO | RNTON | Pierre J. Thuot (Flt 2 - STS-36) | TDEL: | HDOT: -1.0 FPS | 201400 LBS X CG: | ET IMPACT | | <u>VELOCITY</u> 25841 FPS | | NON-DEPLOYED: | TAL WX: |
| | | P253/R112/V72/M100 | 0.64 0.782/0.800 | TD NORM 195: | 1084.4 | LAT: | | 20041773 | | 557221 LBS | - Banjul was NO GO - visibility, Ben Guerir late GO after |
| | | | | 2329 FT | 1001.1 | 12.17°S | | <u>ENTRY</u> | | CARGO TOTAL: 1384113 LBS | occasional ceiling violation and rain. |
| | | M/S 4, EV3: | MAX Q NAV: | | LANDING | LONG: | | RANGE | | 1304113 LD3 | Ĭ |
| | | Kathryn C. Thornton (Flt 2 - STS-33) | 716 PSF 712 PSF | NLGTD: 5770 FT | WEIGHT: | 163.6°W | | 4162 NM | | PERFORMANCE_ | ASCENT I-LOADS: |
| | | P254/R107/V73/F11 | SRB STG: | 137:20:57:48Z VEL: 173 KGS | 201235 LBS X CG: | | | | | MARGINS (LBS): | Nominal I-loads were NO GO and DOLILU was uplinked (second DOLILU uplink and 9th total uplink). Launch and |
| | | | 2:00.64 2:08 | HDOT: -3.5 FPS | 1086.2 | | | | | FPR: 4671 FUEL BIAS: 983 | OMS targets loads uplinked for both window panes. |
| | | M/S 5, EV4: Thomas D. Akers | | | | | | | | FINAL TDDP:3351 | |
| Below: Re | | (Flt 2 - STS-41) | <u>PERF</u> : NOMINAL | DRAG CHUTE DEPLOY: 165 KEAS | | | | | | RECON: 3206 | FLIGHT DURATION CHANGE: |
| Christophe | | P255/R115/V74/M103 | 2 ENC TAL DEN | 137:20:57:49Z | | | | | | DAVI OADC: | - Flight was extended 2 days to allow the third EVA for the hand grab of INTELSAT after capture bar failed on two |
| Columbus' | ' sailing | MCC FCD 1 (27) | 2 ENG TAL BEN: 2:52 2:52 | 137.20.37.492 | | - | - 10 | | 130 | <u>PAYLOADS</u> : <u>PLB</u> : | EVA's. |
| ships Sant | ta Maria, | MCC FCR-1 (27) | 2.02 | BRK INIT: 94 KGS | 1 | | | | | INTELSAT | |
| Nina, and | | FLIGHT DIRECTORS: | NEG RETURN: 4:03 | | | (b) (c) | 2 | | 7 | REBOOST | RENDEZVOUS 10, 11, AND 12: |
| sail by Pac | | Asc/Ent - N. W. Hale | 4:00 4:03 | DRAG CHUTE | A CENT | | | | 1 | (CRADLE & | - With INTELSAT for capture, berthing, AKM mounting, and |
| honor of | | Ld/O 1 - G. A. Pennington O 2 - P. L. Engelauf | DTV (11/2 382). | <u>JETTISON</u> : 48 KGS 137:20:58:17Z | | | | *1 ^ | - | PERIGEE STAGE) | deploy. |
| Endeavou | r's | Plng - J. M. Heflin | PTA (U/S 285): 4:39 4:40 | 137.20.30.17L | ** | * | Y | * | - | PERIGEE STAGE | FIRSTS: |
| maiden vo | - | MOD - B. R. Stone | | AVE BRK DECEL: | | 7 | XX. | **** | NO. | ATTACHED TO | - First flight with drag chute |
| maiden vo | yago. | | PTM (U/S 285): 5:53 5:43 | 8.0 FPS/S | 1 | AVA | * | | | INTELSAT | - First flight with Improved Nose Wheel Steering First flight of Collins TACAN, SS STAR-TRACKER, |
| | | | 5:53 5:43 | WHEELS STOP: | * | | t X | W 1* | | WHICH WAS REDEPLOYED | I- FIIST HIGHT OF COMMS TACAN, SS STAR-TRACKER, |
| | | | MECO CMD: | 137:20:58:34Z | | * | Sw A | | | NEDEPLOTED | redesigned MPS 750 PSIG He Reg, MPS 850 PSIG He relief valve redesign, IAPU iso valve, redundant WOW det, |
| | | | | 11646 FT | | | - | | 1 | MIDDECK: | brake press iso valve, improved RA antennas, deletion of |
| | | | | BOLL OUT | | 111 | | | | CPCG BLOCK II | vent doors 4 & 7, fourth EMU stowage, and improved PPO ₂ |
| | 7 | | <u>VI</u> : | ROLLOUT: | | 100 | 11/1 | | | AMOS UVPI | sensor and 3 IAPU's. |
| | itin is | I | 25906 25900 | 9490 FT 55 SECS | | | | | _ | UVPI | - First flight with 4 EVA's and first flight with 3 crewmemebers on same EVA. First flight with 4 different |
| 10 | | | OMS-2: | 00 JEOJ | | | | 6 Middeck c | rew | 4 CRYO TK SETS | EVA crewmen. |
| 1 | Toron Salation | | OMS-2: 39:58.2 39:57.6 | <u>WINDS</u> : | portrait - f | | | | | | - First hand capture of satellite by EVA crewmen (Hieb, |
| | | 7- 6-1 | 186.2FPS187.97FPS | H2.0 KTS, X0.0 KTS | | | | niddlle row, I | | RMS 26 (S.N. 303) Used to berth, repair, | Thuot, and Akers), then RMS grapple of INTELSAT on |
| | | | | OFFICIAL: 4H, 0L | to right, T | huot/MS & | & Akers/ | MS, back ro | w, | & deploy INTELSAT | capture bar. - First flight of OI-21. |
| | | | | Continued | left to righ | | | | | & monitor simulta- | - First flight of Block II SSME Controller. |
| \$02,30074 | 1/KSC- 02PC 0 | 67 1992-06-18 | | Continuou | Chilton & | | | | | neous waste and | |
| 372-37074 | 1/100- 721 0-7 I | 1772-00-10 | | | | | | | | supply water dump | Continued |
| | | | | | | | | | | | |

| | | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
|-----|---------|---------|--------------|----------------|---------------|-----------|------|-----------|--------|-----|-------------|--------------------------------------|
| | | | (7) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | (| ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| | FLT | ORBITER | | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| | NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | | | | WINDS | ENG. S.N. | | | | | | |
| ST | S-49 | | | | | | | | - A MA | · V | | |
| | | | Continued | | Continued | | | | | 1 | | Continued |
| Cor | ntinued | | | | | | | A Comment | | | | |

EMU/TETHERED EVA'S:

EVA 1 - 5/10/92 SS EVA #16 BY EV1 & EV2 INTELSAT CAPTURE BAR - NO GO 3H43M

EVA 2 - 5/11/92 SS EVA #17 UNSCHEDULED EVA #3 BY EV1 & EV2 INTELSAT CAPTURE BAR - NO GO 5H30M

EVA3 - 5/13/92 SS EVA #18 UNSCHEDULED EVA #4 BY EV1, EV2 & EV4 INTELSAT HAND CAPTURE, REPLACED UPPER STAGE AND RELEASED 8H29M

EVA4 - 5/14/92 SS EVA #19 BY EV3 AND EV4 ASEM - 7H45M

DENS ALT: 4664 FT

FLIGHT DURATION: 8:21:17:39 213:17:39

S/T: 293:20:29:35

OV-105 TOTAL: 8:21:17:39

DISTANCE: 3,969,019 sm



STS049-91-020 1992-05-16 STS-49 crewmembers complete successful capture of the International Telecommunications Organization Satellite (INTELSAT VI) during EVA3. Left to right, Hieb/MS, Akers/MS, & Thuot/MS, on RMS, have handholds on the satellite and prepare to attach capture bar (tethered to Hieb). Two earlier grapple attempts on two-person EVA's were unsuccessful.

- Longest ever EVA (8H29M), second longest EVA
- Longest EVA by female astronaut (7H45M).
- Four EVA's on one flight.

- SIGNIFICANT ANOMALIES: Av Bay 3 high delta pressure. O2 manifold valve 1 failed open (failed to close)
- TDRSS state vector propagation errors in MCC.
 Orbit Target Terminal Initiation Computation failure on hird rendezvous (used D/L state vectors in Ground
- Computations). · WCS fan sep 1 failure.
- Four floodlights failed.
- RCS jet L4L fail leak.
- Ku-band beta gimbal failure IFM EVA stow of antenna similar to STS 41-G.
- PLBD port aft bulkhead latch failed to
- reach latch position.
- SSME 2 HPFT TD temp sensor failed offscale high.
- GPC AP101S microcode error.



S92-36605 1992-05-20 STS-49 Orbit Team 1 (O1) poses in JSC FCR with O1 Lead FD Al Pennington (left of model of James Cook's ship Endeavour) and CAPCOM, John Casper (right of model).



S93-36604 1993-06-18 Oribt 2 (O2) Flight Control Team in JSC FCR poses with O2 FD Philip Engelauf (center front, right of Endeavour model).



S92-36606 1992-05-20 Milt Heflin/FD (front right next to ship model) with STS-49 Planning Team in JSC Flight Control Room.

| | | | <u> </u> | OL OHO | | | | | | ~ - | |
|----------------------|--------------|---|--------------------------------|---|----------------------|---------------------------|---------------------|-----------------------|-----------------|--------------------------------|--|
| | | CREW (7) | LAUNCH SITE, | LANDING SITE/ RUNWAY, | SSME-TL NOM-ABORT | SRB | , | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (7) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | (| JKDII | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | UNDITER | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | 1300 | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| IVO. | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | IIVC | HAVIIF | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | & LVA 3 | ADURT HIVILS | WINDS | ENG. S.N. | LI | | | | LAFERINILINIS | TIKSTS, SIGNII ICANT ANOMALIES, ETC.) |
| STS-50 | OV-102 | CDR: | KSC 39, PAD A | KSC 33 (KSC 10) | 104/104/ | BI-051 | 28.46° | DIRECT | OI-21 | CARGO: | KSC W/D: OPF 108, VAB 5, PAD 23=136 days |
| 313-30 | (Flight 12) | Richard N. Richards | 177:16:12:23Z | 191:11:42:27Z | 109% | | (28) | INSERTION | (2) | 32447 LBS | <u></u> |
| SEQ FLT #48 | Columbia | (Flt 3 - STS-28 | | 7:42:27 AM EDT | | RSRM | | | | | LAUNCH POSTPONEMENTS: |
| | 9th Spacelab | & STS-41) P256/R101/V55/M92 | | Thursday 5 7/9/92 (1) | PREDICTED: 100/104/ | 24W | | POST OMS-2 163.5 X | | <u>PAYLOAD</u> CHARGEABLE: | - Launch date was 5/11/92 as of 7/10/91. |
| KSC-48 | Flight | P250/R101/V55/IVI92 | Thursday 12 6/25/92 (5) | 7/9/92 (1) | 100/104/ | ET-50 | | 153.5 X 159.7 NM | | 24305 LBS | - Launch postponed to 6/3/92. Weather delayed OV-102 |
| | Long Module | PLT: | 0/20/72 (0) | DEORBIT BURN: | 104/12/104 | LWT-43 | | 137.7 14101 | | 24303 EB3 | delivery to KSC after major mod period at Palmdale Launch postponed to 6/25/92 because of Ku-Band comm |
| | (6) | Kenneth D. Bowersox | LAUNCH WINDOW | 191:10:41:38Z | ACTUAL: | | | <u>ORBIT</u> | | DEPLOYED: | work, RSB corrosion repair, and LiOH canister locker |
| <u>PAD</u> 39A-34 | EDO 1 | P257/R146/M130 | 2H 30M CTOB | VDANCE 200 NA | 100/104/ | <u>ET</u> | | <u>ADJ 1</u> : | | 0 LBS | interference. |
| 39A-34 | EDO 1 | M/S 1 (PYLD CDR): | EOM PLS: EDW | XRANGE: 389 NM | 104/74/104 | RPT 247K | | 159.9 X 159.2 NM | | NON-DEPLOYED: | LAUNCH SCRUB: None. |
| MLP-3 | OMS PODS | Bonnie J. Dunbar | TAL: BYD | ORBIT DIR: DL 23 | 1 = 2019 (10) | 1:17:12 | | 04/00:23:18 | | 22126 LBS | LAUNCH SCRUD. None. |
| | LP05-1 | (Flt 3 - STS 61-A | TAL WX: BEN, ROTA | | 2 = 2031 (7) | MET | | | | | LAUNCH DELAYS: |
| | RP05-1 | & STS-32) | OF! FOTED | <u>aim Pt</u> : Nominal | 3 = 2011 (7) | ЕТ | | <u>ORBIT</u> | | MIDDECK: | - 5M 23S delay during T-9 hold due to a concern about a |
| | FRC2-12 | P258/R79/V49/F7 | SELECTED: RTLS: KSC 15/CI/N | MLGTD: 2321 FT | | <u>ET</u> <u>BR/UP</u> | | ADJ 2: 163.0 X | | 2179 LBS | cirrus layer at 28K-33K with a detached anvil (potential lightning in launch area). WX STA PLT reported it was not |
| | | <u>M/S 2</u> : | TAL: BEN 36/N/N | 191:11:42:27Z | | 216K | | 129.1 NM | | SHUTTLE | a problem because he could see through it. |
| | | Ellen S. Baker | AOA: EDW 22/N/N | VEL: 208 KGS | M 3 EOM | 1:18:03 | | | | ACCUMULATED | a problem because he could see through it. |
| | | (Flt 2 - STS-34) | <u>PLS</u> : EDW 22/N/N | 203 KEAS | WEIGHT: | MET | | <u>DEORBIT</u> | | WEIGHTS: | TAL WX: |
| | | P259/R105/V75/F10 | TDEL | HDOT: -2 FPS | 225865 LBS | гт | | 163 X | | DEPLOYED: | - Banjul forecast and observed NO GO - ceiling. Ben Guerir forecast and observed GO (selected). Rota forecast |
| | | M/S 3: | TDEL: 0.682/0.72 | TD NORM 205: | X CG: 1077.7 | ET IMPACT | | 130 NM | | 663337 LBS NON-DEPLOYED: | NO GO - Vis (Haze), observed GO. |
| | | Carl J. Meade | 0.40 0.002/0.72 | 2122 FT | 1077.7 | LAT: | | VELOCITY | | 581526 LBS | 110 do - vis (Haze), observed do. |
| | | (Flt 2 - STS-38) | MAX Q NAV: | | LANDING | 13.28°N | | 25786 FPS | | CARGO TOTAL: | ASCENT I-LOADS: |
| | | P260/R117/V76/M105 | 688 PSF 690 PSF | NLGTD: 7832 FT | WEIGHT: | LONG: | | ENTEN | | 1416560 LBS | - Nominal selected, no uplink required. |
| 711 | PDe | P/S 1: | SRB STG: | 191:11:42:45Z VEL: 149 KGS | 225615 LBS X CG: | 162.64°W | | ENTRY RANGE | | PERFORMANCE | FLIGHT DURATION/LANDING SITE CHANGE: |
| BAR RICHA | 801 | Larry DeLucas | | HDOT: -5.1 FPS | 1079.1 | | | 4347 NM | | MARGINS (LBS): | - Extended 1 day because of forecasted rain at EDW. |
| STATE OF E | | P261/R147/M131 | 2.0017 | | 1.07,711 | | | 10171111 | | FPR: 4671 | - Changed landing site to KSC and landed one rev early |
| a EGY H | III S | (U OF ALA, BIRM) | <u>PERF</u> : NOMINAL | DRAG CHUTE | | | | | | FUEL BIAS: 983 | because EDW had forecast of rain in clouds. |
| i ay | 三 | P/S 2: | 2 ENG TAL (BEN): | <u>DEPLOY</u> : 136 KEAS 191:11:42:47Z | | | | | | FINAL TDDP:2940 RECON: 3276 | FIRSTS: |
| UI, | E | Gene Trinh | 3:01 3:00 | 191.11.42.472 | | | | | | RECON. 3270 | - First flight of OV-102 after OMDP (Major Mods at |
| AEA | LUCK | P262/R148/M132 | 0.00 | BRK INIT: 111 KGS | | | | | | PAYLOADS: | Palmdale). |
| MEA | DE UC | (JPL) | NEG RETURN: | | | | | | | PLB: | - First EDO flight and EDO pallet. |
| | | | 3:57 4:00 | <u>DRAG CHUTE</u> JETTISON: 55 KGS | | | | | | UNITED STATES MICROGRAVITY | - First flight of RCRS (Regenerable CO2 Removal System). - First flight of OV-102 with drag chute, INWS, etc. (Second |
| | | | PTA (U/S 235): | 191:11:43:11Z | 100 | 74. | | US COUNTY IN | | LABORATORY | flight of drag chute - deployed after NLGTD). |
| | | | 4:57 4:54 | 171.11.70.112 | | PER | THE PERSON NAMED IN | KAR I | | (USML-1/LM) | - First flight to exceed GEMINI VII flight duration (by 54:33). |
| | | | | AVE BRK DECEL: | 1 | 110 | | 1 516 | 1 | MATERIALS | Only 3 SKYLAB flights exceed STS-50 duration. |
| | | MCC ECD 1 (20) | PTM (U/S 235): 5:58 5:40 | 6.6 FPS/S | | 03 | | A. | 1 | SCIENCE, | DDAC CHITE STDATECY, Second dress shorts dealers |
| | | MCC FCR-1 (28) | ე.ეგ 5:40 | WHEELS STOP: | | water. | JAN ST | 7 19 | - 1 | FLUID PHYSICS, COMBUSTION | DRAG CHUTE STRATEGY: Second drag chute deploy with NLG on ground. |
| | | FLIGHT DIRECTORS: | MECO CMD: | 191:11:43:25Z | 15236 | 超鐵 | | | 1 | SCIENCE, BIO- | With NEO on ground. |
| | | Asc/Ent - J. W. Bantle | 8:26.9 8:27.6 | 12996 FT | | . 60 | | E I I E | R | TECHNOLOGY | |
| | | Ld/O 2 - R. E. Castle | VII. | DOLL OUT | | | | | Name of Street, | MIDDECK | Continued |
| | | O 1 - R. D. Jackson O 3 - G. E. Coen | <u>VI</u> : 25875 25870 | ROLLOUT: 10675 FT | | 101 | S.Y | THE PERSON NAMED IN | 1 | MIDDECK: IPMP | |
| | | Team 4 - R. M. Kelso | 23073 23070 | 58 SECS | - 3 | | AA | Q NA 1 | R | LIVPI | |
| | | MOD - A. L. Briscoe | OMS-2: 39:56 39:51 | | | 5 | | | 1 | SAREX-II | |
| | | | 39:56 39:51 | WINDS: | | 40 | | | 197 | 4 4 500 | |
| | | | 222.3 FPS222.6 FPS | H 1.6 KTS L 4.8 KTS | Burns 1 | S A Z | | | 11 | 4 + 4 EDO CRYO TK SETS | |
| | | | | OFFICIAL 1H, 5L | | | | | | CKIO IN SEIS | |
| | | | | · | STS050-2 | 291-006 19 | 992-07-0 | 09 In orbit cr | ew | NO RMS | |
| | | | | Continued | | | | SML-1/LM. | | | |
| | | | | | • | | | | | | |
| | | | • | | | | | | | • | |

| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
|-----|---------|--------------|----------------|---------------|-----------|------|-----|-------|-----|-------------|--------------------------------------|
| | | (7) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | (| ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | | | WINDS | ENG. S.N. | | | | | | |

STS-50 Continued



STS050-291-027 1992-07-09 Dunbar/MS/PYLD CDR (rt) and DeLucas/PS in SL with Lower Body Negative Pressure Study.

Continued. . .

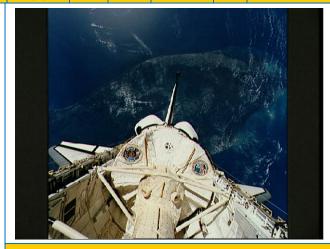
DENS ALT: 1423 FT

FLT DURATION: 13:19:30:04 331:30:04

S/T: 307:15:59:29

OV-102: 88:20:44:28

DISTANCE: 5,758,332 sm



STS050-81-027 STS050-81- First U.S. Microgravity Laboratory (USML-1) module is pictured in the P/L Bay in this scene over the southern two-thirds of the Florida peninsula. KSC is just above Columbia's starboard wing.

Continued. . .

- SIGNIFICANT ANOMALIES:
 RCRS shutdown due to a short in the controller, hence LiOH canisters used until IFM required use at 5 days
- SL/Orbiter air not mixing properly. Found a removable inline redundant seal was not removed from tunnel air ducting as should be for on-orbit operations.
- Waste water dump line blockage causing reduction in dump rate.
- Cryo O₂ tank 2 had a 1 lb/hr leak. Cryo O₂ tank 2 heater A2 experienced intermittent power
- Fuel cell 3 O₂ purge valve did not close completely. Manually closed, did not purge again for remainder of
- Cryo O₂ tank 7 check valve failed in open position.
- SS inverter overvolt shut down when SL H₂O loop was turned on.
- FWD starboard floodlight did not come on.
- R OMS yaw TVC excessive movement during ascent.
 Alleron trim deflected to 2.2° at M=10.1, preflight predicted was maximum of 0.80 deflection.
- TAGS jam on day 2, used teleprinter. Flight deck Canon A1, Mark II camcorder failure.
- ROB brake pressure low.
 APU 1 gearbox N₂ pressure decay/ transducer erratic.
 L1U jet heater fail on.

- F2F iet fail off.



Top Lt to Rt: Canary Islands & ocean wakes (STS050-82-002) and Dust Storm, Red Sea, & Saudi Arabia (STS050-85-037). Bottom Lt to Rt. Mt. Pinatubo Volcano - Post Eruption, Luzon, Philippines (STS050-52-026) and Andes Mountains, Chile and Argentina (STS50-112-060).











STS050-S-106 - First flight of OV-102 with drag chute, INWS, etc. (Second flight of drag chute - deployed after NLGTD).



STS50-s-084 -- Unidentified Flight Controller hangs mission plaque in FCR.

| | | CREW | | I ANDING CITE! | SSME-TL | | | | | | |
|--|--|--|-------------------------------|--------------------------------|---|--------------------|-----------|------------------------|------------------------|--------------------------------------|---|
| | | (7) | LAUNCH SITE, | LANDING SITE/ RUNWAY. | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (1) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | ' | OKBH | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | ORDITER | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | 1 3 1 1 | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| IVO. | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | IIVC | TIPVITE | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | Q EVA 3 | ADOINT HIVIES | WINDS | ENG. S.N. | L' | | | | LAI LINIVILIVIS | TIKSTS, SIGNII ICANT ANOMALIES, ETC.) |
| STS-46 | OV-104 | CDR: | KSC 39, PAD B | KSC 33 (KSC 11) | 104/104/ | BI-052 | 28.46° | DIRECT | OI-21 | CARGO: | KSC W/D: OPF 61, VAB 5, PAD 45=111 days |
| 313-40 | (Flight 12) | Loren J. Shriver | 213:13:56:48Z | 221:13:11:50Z | 109% | | (29) | INSERTION | (3) | 34060 LBS | THE THE STATE OF THE BOTT BOTT BOTT BOTT BOTT BOTT BOTT BOT |
| SEQ | Atlantis | (Flt 3 - STS 51-C | 9:56:00 AM EDT (P) | 9:11:50 AM EDT | | RSRM | ` ′ | | ` ' | DAVIOAD | <u>LAUNCH POSTPONEMENTS</u> : |
| FLT #49 | | & STS-31) | 9:56:48 AM EDT (A) | Saturday 9 | PREDICTED: | 25W | | POST OMS-2 | | <u>PAYLOAD</u> CHARGEABLE: | - Launch date 6/26/92 as of 6/5/91. |
| | | P263/R50/V51/M46 | Friday 8 | 8/8/92 (4) | 100/104/ | FT 40 | | 230.4 X | | 28585 LBS | - Launch postponed to 7/2/92 because of STS-45 launch |
| KSC-49 | OMS PODS | PLT: | 7/31/92 (2) | DEORBIT BURN: | 80/67/104 | ET-48 LWT-41 | | 228.3 NM | | | and landing delays Launch postponed to 7/21/92 because of MOD STS-50 |
| DAD | LPO1-18 | Andrew M. Allen | LAUNCH WINDOW | 221:12:17:107 | ACTUAL: | LVV 1-41 | | EURECA | | DEPLOYED: | landing to launch 8-day constraint and range interference. |
| <u>PAD</u> 39B-15 | RPO1-18 | P264/R149/M133 | 2H 30M CTOB | 2211121111102 | 100/104/ | <u>ET</u> RPT | | DEPLOY: | | 9901 LBS | - Launch postponed to 7/31/92 to allow additional flightcrew |
| MLP-1 | FRC4-12 | | | XRANGE: 499 NM | 82/67/104 | RPT | | 231.3 X | | NON-DEPLOYED: | and flight controller training. |
| | | <u>M/S 1</u> : | EOM PLS: KSC | 00017 DID DI 04 | | 239K | | 227.8 NM | | 16094 LBS | L ALINIAL GARLIR III |
| | | Claude Nicollier | TAL: BYD TAL WX: BEN, ROTA | ORBIT DIR: DL 24 | 1 = 2032 (1) | 1:21:02 MET | | TCC DEDLOV | | MIDDECK. | LAUNCH SCRUB: None. |
| | | (Switzerland) P265/R150/M134 | TAL WA: BEN, RUTA | AIM PT: NOMINAL | 2 = 2033 (1) 3 = 2027 (8) | IVIE | | TSS DEPLOY: 161.0 X | | MIDDECK: 1104 LBS | LAUNCH DELAYS: |
| | | 1 203/1(130/10134 | SELECTED: | Alivi I . NOMINAL | 3 - 2027 (0) | ET | | 158.5 NM | | | - 0M 48S delay at APU startup (approxi-mately L-5 |
| | | M/S 2: | RTLS: KSC 15/CI/N | MLGTD: 1866 FT | | <u>ET</u> BR/UP | | 10010 11111 | | <u>SHUTTLE</u> | - 0M 48S delay at APU startup (approxi-mately L-5 minutes). Crew did not open APU #3 fuel isolation valve |
| | | Marsha S. Ivins | TAL: BEN 36/N/N | 221:13:11:50Z | M 3 EOM | 217 K | | TSS DOCK: | | <u>ACCUMULATED</u> | within GLS window. KSC cleared hold and count |
| | | (Flt 2 - STS-32) | AOA: EDW 22/CI/N | VEL: 202 KGS | WEIGHT: | 1:21:39 | | 161.0 X | | WEIGHTS: DEPLOYED: | continued. |
| | | P266/R109/V77/F12 | PLS: EDW 22/CI/N | 195 KEAS HDOT: -1 FPS | 209851 LBS X CG: | MET | | 157.8 NM | | 673238 LBS | TAL WX: |
| | | PYLD CDR, M/S 3: | TDFI · | проттгР3 | 1078.2 | ET | | <u>DEORBIT</u> | | NON-DEPLOYED: | - Banjul (prime) NO GO - ceiling Ben Guerir GO |
| | | Jeffrey A. Hoffman | <u>TDEL</u> : 0.0 0.332/0.36 | TD NORM 195: | 1070.2 | IMPACT | | 121 X | | 598724 LBS | - Banjul (prime) NO GO - ceiling, Ben Guerir GO (selected), Rota (2nd flight as substitute for Moron) NO GO |
| | | (Flt 3 - STS 51-D | | 1891 FT | LANDING | LAT: | | 121 NM | | CARGO TOTAL: | - visibility (haze). |
| | | & STS-35)) | MAX Q NAV: | | WEIGHT: | 17.86°N | | | | 1450620 LBS | |
| | | P267/R57/V59/M52 | 709 PSF 718 PSF | NLGTD: 6501 FT | 209532 LBS | LONG: | | VELOCITY 25698 FPS | | PERFORMANCE | ASCENT I-LOADS: |
| | | M/S 4: | SRB STG: | 221:13:12:05Z VEL: 154 KGS | X CG: 1179.6 | 153.0°W | | 25098 FPS | | MARGINS (LBS): | - DOLILU I-Load uplinked to increase margin for green squatcheloid at M=1.53. Third DOLILU uplink, total uplink |
| | | Franklin R. Chang-Diaz | | HDOT: -4.3 FPS | 11/7.0 | | | ENTRY | | FPR: 4671 | #10. |
| | | (Flt 3 - STS 61-C | 2.01.2 | 110011 1.0110 | | | | RANGE | | FUEL BIAS: 983 | , 10. |
| | | & STS-34) | PERF: NOMINAL | BRK INIT: 131 KGS | | | | 4397 NM | | FINAL TDDP:2825 RECON: 1942 | FLIGHT DURATION/LANDING SITE CHANGE: |
| | | P268/R89/V46/M81 | 0 ENO EN (BEN) | A. / E. D.D. / D.E. O.E. / | | | | | | | - Extended 1 day because of TSS deploy problems. |
| | | D/C 1. | 2 ENG TAL (BEN): 2:51 2:54 | AVE BRK DECEL: 5.9 FPS/S | | | 2 | 阿罗斯 | | PAYLOADS: | - Waved off first landing opportunity at KSC because of scattered showers within 30 miles. Total extension, 1 day |
| | | P/S 1: Franco Malerba | 2:51 2:54 | 5.9 FPS/S | | | | | | PLB: | plus 1 rev. |
| | | (Italy) | NEG RETURN: | WHEELS STOP: | The latest | 1000 | | 111100 | NAME OF TAXABLE PARTY. | European Retrievable Carrier | pius i iev. |
| | | P269/R151/M135 | NEG RETURN: 4:02 | 221:13:12:55Z | 2 2 2 | | 7.9 | | 30 | (EURECA) | FIRSTS: |
| | | | | 12726 FT | | | | | | (Deployed) | - First flight of a deployment and retrieval of a tethered |
| ,cR | AU | | PTA (U/S 285): | ROLLOUT: | | | 936 | ask. | 302 | ' ' ' ' | satellite. |
| ALL AND ADDRESS OF THE PARTY OF | The state of the s | | 4:23 4:22 | ROLLOUT: 10840 FT | 1 | 30 | | | | Tethered Satellite System (TSS-1) | NOTE: TSS deployed weight of 1040 lbs plus 90 lbs prop is |
| i i | 1 | | PTM (U/S 285): | 55 SECS | | | 1 | 00 | | (Deployed and | not included in 9901 lbs deployed. |
| 3 | | | | WINDS: | | | 1 | | 4 | Retrieved) | not moradou in 7701 ibo dopioyod. |
| | 震 (2) | | | T 0.4, L 0.9 KTS | | | | | | | LASTS: |
| 100 | | | MECO CMD: | OFFICIAL 3H, 1R | 100 | Sales of the sales | | 4 | Dr. | EOIM-III TEMP 2A-3 | - Last flight of fleet without drag chute, INWS, and other |
| SIER. | CHANG BIAL | | 8:29 8:29.8 | DENC ALT. 1024 FT | No. of Concession, | | | | | ICBC, | improvements first used on STS-49. These modifications |
| | @ | | VI· | DENS ALT: 1834 FT | CTCO4C | 12 000 | 1002.0 | 8-08 Crew | | CONCAP-II | will be made before the next flight of OV-104. |
| | | | <u>VI</u> : 25987 25985 | FLT DURATION: | | | | | | CONCAP-III | THIRD SHUTTLE CREWMEMBER REPLACEMENT: |
| | | | | 7:23:15:02 | | | | ar (It to rt) | | LDCE | - Robert "Hoot " Gibson was replaced by Shriver in 1990. |
| | | | OMS-2: 41:23.6 41:23.6 | 191:15:02 | CDR Sh | river, PL | T Allen | , & Chang- | | MIDDECK: | (Second Shuttle crewmember replacement occurred on |
| | | MCC FCR-1 (29) | 41:23.6 41:23.6 | <u>S/T</u> : 315:15:14:31 | | | | Nicollier/N | /IS | PHCF | STS-44.) |
| | | ELICHT DIDECTORS | 351.2 FPS351.4 FPS | | | | | , Ivins/MS, | | UVPI | EVENTS: |
| | | FLIGHT DIRECTORS: A/E/O 1 - R. D. Dittemore | | <u>OV-104</u> : 72:09:53:00 | | | | | | A CDVO TV SETS | EVENTS: - EURECA deploy at 1/17:10 MET. |
| | | Ld/O 2 - C. W. Shaw | | | | | · , | Note the cr | ew | 4 CRYO TK SETS | - TSS deploy at 4/08:57:22 MET. |
| | | O 3 - P. L. Engelauf | | DISTANCE: 3,321,007 sm | | | | o middeck | | RMS 27 (S.N. 201) | - TSS dock at 5/08:56:12 MET. |
| | | MOD - B. R. Stone | | 3,321,007 sm | floor with | n sleep s | tation in | n backgroui | nd. | USED FÖR | Continued |
| | | | | | | • | | | | EURECA DEPLOY | Continued |
| | | | | | | | | | | | |

| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
|-----|---------|--------------|----------------|---------------|-----------|------|-----|-------|-----|-------------|--------------------------------------|
| | | (7) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | (| ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | | | WINDS | ENG. S.N. | | | | | | |

STS-46

At left: STS046-17-017 1992-08-08 Ivins/MS (left) and Hoffman/MS and PLC Continued are conducting the Tether Optical

Phenomena (TOP) experiment.



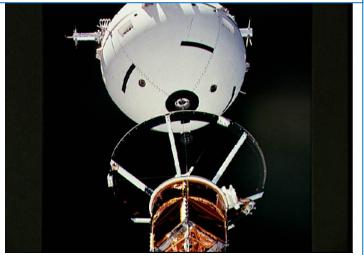
Continued. . .

- SIGNIFICANT ANOMALIES:
 MPS GH2 FCV erratic pressure.
 Fan Sep 1 flooded, indicated stall currents and CB opened. Fan Sep 2 temporarily flooded.
 P/L EURECA RF data handling problem (PSP lost lock due to excessive zeros in payload bit stream).
 Flight deck speaker failed.
 TSS U2 umbilical retractions failed when commanded by

- TSS deployer reel stalling at 179 and 251 meters.
 TSS upper tether control mechanism jam at 224 meters.
 Postflight investigation found the TSS level wind mechanism was jammed by a structural reinforcement bolt which was added based on late loads analysis.



STS046-102-021 1992-08-08 OV-104's RMS grapples EURECA-1L and holds it in deployment position above PLB



STS-46 Tethered Satellite System 1 (TSS-1) satellite is reeled out via its thin Kevlar tether into the blackness of space during deployment operations from Atlantis payload bay (PLB).

| | | | OI A | CE SHU | | | CIAO | | | \ I | 1 ago 2 00 010 11 |
|----------------------|--|---|--|---|------------------------|------------------|--------------|-----------------------|---------|--------------------------------|--|
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
| | | (7) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | (| DRBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | | | WINDS | ENG. S.N. | | | | | | |
| STS-47 | OV-105 | CDR: | KSC 39, PAD B | KSC 33 (KSC 12) | 104/104/ | BI-053 | 57.02° | DIRECT | 01-21 | CARGO: | KSC W/D: OPF 77, VAB 5, PAD 17=99 days |
| | (Flight 2) | Robert L. Gibson | 256:14:23:00Z | 264:12:53:22Z | 109% | DCDM | (11) | INSERTION | (4) | 32480 LBS | LAUNOU DOCTDONEMENTO |
| SEQ FLT #50 | Endeavour | (Flt 4 - STS 41B, STS 61-C, STS-27) | 10:23:00 AM EDT (P) 10:23:00 AM EDT (A) | 8:53:22 AM EDT Sunday 8 | PREDICTED: | RSRM 26W | | POST OMS-2 | | PAYLOAD | LAUNCH POSTPONEMENTS: - Launch date 8/12/92 as of 8/21/91. |
| KSC-50 | Spacelab-J | P270/R30/V27/M29 | Saturday 3 | 9/20/92 (5) | 100/100/ | 2000 | | 163.1 X | | CHARGEABLE: | - Launch postponed to 9/1/92 due to STS-49, STS-50, and |
| K3C-30 | (Japan) | . 276/1106/12/11112/ | 9/12/92 (3) | 1 | 100/67/104 | ET-45 | | 162.7 NM | | 28092 LBS | STS-46 delays. |
| PAD | | PLT: | | DEORBIT BURN: 264:11:52:20Z | | LWT-38 | | | | | - Launch postponed to 9/11/92 because of DFRF work and |
| <u>PAD</u> 39B-16 | Tenth | Curtis L. Brown | LAUNCH WINDOW: | | ACTUAL: | ГТ | | | | DEPLOYED: | ferry to KSC being delayed. |
| MLP-2 | Spacelab Flight | P271/R152/M136 | 2H 30M CTOB | XRANGE: 669 NM | 100/100/ 100/67/104 | <u>ET</u> RPT | | | | 0 LBS | LAUNCH SCRUB: None. |
| | Long Module | M/S 1: | EOM PLS: KSC | ORBIT DIR: AR 5 | 100/07/104 | KF I | | <u>DEORBIT</u> | | NON-DEPLOYED: | LAUNCH SCRUD. None. |
| | (7) | Mark C. Lee | TAL: ZZA | AIM PT: CLOSEIN | 1 = 2026 (3) | <u>ET</u> | | 166 X | | 26247 LBS | LAUNCH DELAYS: None. |
| | | Payload CDR | TAL WX: ROTA, BEN | | 2 = 2022 (8) | BR/UP | | 161 NM | | | |
| | OMS PODS: | (FIt 2 - STS-30) | CELECTED | MLGTD: 2458 FT 264:12:53:22Z VEL: 209 KGS 202 KEAS | 3 = 2029 (6) | ГТ | | VELOCITY | | MIDDECK: 1845 LBS | TAL WX: |
| | LPO3 - 13 RPO4 - 9 | P272/R100/V78/M91 | SELECTED: RTLS: KSC 33/CI/N | Z64:12:53:22Z VFI · 209 KGS | | ET IMPACT | | VELOCITY 25803 FPS | | 1845 LBS | - Zaragoza (prime) - GO (selected), Rota - GO. Ben Guerir - GO. |
| | FR5 - 2 | M/S 2: | <u>TAL</u> : ZZA 30/N/SF | 202 KEAS | M 3 EOM | LAT: | | 23003173 | | SHUTTLE | Den Guerii - GO. |
| | 1113 2 | Jay Apt | AOA: NOR 17/N/N | HDOT: 0 FPS | WEIGHT: | 43.99°S | | <u>ENTRY</u> | | ACCUMULATED | DOLILU/NOMINAL I-LOADS: |
| | | (Flt 2 - STS-37) | PLS: EDW 22/CI/N | TD NORM 205: | 220325 LBS | LONG: | | RANGE | | WEIGHTS: | - Nominal I-loads selected, no uplink required. |
| | | P273/R123/V79/M110 | TDEL | 2367 F I | X CG: | 158.8°W | | 4341 NM | | DEPLOYED: | FLICHT DUDATION CHANCE |
| | | M/S 3: | <u>TDEL</u> : -0.16 -0.118/-0.08 | DRAG CHUTE | 1083.7 | | | | | 673238 LBS NON-DEPLOYED: | FLIGHT DURATION CHANGE: - Extended one day for science gain/enhancement. |
| | | N. Jan Davis | -0.10 -0.110/-0.00 | DRAG CHUTE DEPLOY: 176 KEAS | LANDING | | | | | 626816 LBS | - Extended one rev because rain forecast within 30 nm at |
| | | P274/R153/F17 | MAX Q NAV: | 264:12:53:30.9Z | WEIGHT: | | | | | CARGO TOTAL: | KSC. |
| | | | 679 PSF ~682 PSF | NLGTD: 7651 FT | 220195 LBS | | | | | 1483100LBS | |
| | | M/S 4: | CDD CTC | 264:12:53:39Z VEL: 135 KGS HDOT: -2.2 FPS | X CG: | | | | | DEDEODMANOE | FIRSTS: |
| | | Mae C. Jemison P275/R154/F18 | SRB STG: 2:04 | HDOT: -2.2 FPS | 1085.3 | | | | | PERFORMANCE MARGINS (LBS): | First flight with married couple as crew members (M/S 1 and M/S 3). |
| | | F2/3/K134/1 10 | 2.04 | | | | | | | FPR: 4671 | - First flight to deploy drag chute with nose in air Deploy |
| | | <u>P/S 1</u> : | PERF: NOMINAL | BRK INIT: 114 KGS | | 11.01 | | | -10 | FUEL BIAS: 983 | - First flight to deploy drag chute with nose in air. Deploy was at 185 KGS at 8 seconds after MLGTD. Chute pulled |
| | | Mamoru Mohri | | AVE BRK DECEL: 6.9 FPS/S | | in the | | | | FINAL TDDP: 1348 | right 8° ± 2° causing nose to move left 27 feet. |
| | | (Japan) P276/R155/M137 | 2 ENG TAL (ZZA): 3:05 3:07 | 6.9 FPS/S | | | | 27 | | RECON: 2887 | CICNIFICANT ANOMALIEC. |
| | | P2/0/R155/IVI13/ | 3:05 3:07 | CHUTE JETTISON: | - // | 111111 | | | IEI. | PAYLOADS: | SIGNIFICANT ANOMALIES: - RCS JET L3A failed off. |
| | | | NEG RETURN: | 264:12:53:57Z 55 KGS | 7 | (J. 1900) | I Y | | | PLB: | - L5D low chamber pressure. |
| | | | 4:04 4:04 | | | | 211 | 1 113 | | SPACELAB-JAPAN | - DDS 1 H/W transient, screen blank and display |
| 105 | ON APT BR | 01 | DTA (11/0 005) | WHEELS STOP: | | | 66 | N SI | T . | MATERIALS | overwrites. |
| Glbs | | WN | <u>PTA (U/S 285)</u> : 5:22 5:22 | 264:12:54:11Z 11025 FT | | | | | Toler . | SCIENCE AND LIFE SCIENCES | - Condensation on H2O loop lines. - Transient WCS fan separator stall currents. |
| L° AT | | 7 4 20 | 3.22 3.22 | | 7 | 1/4 | | | | EXPERIMENTS | - Cryo O ₂ tank 4 controller problem. |
| J | | 7 2 1 | PTM (N/A): | ROLLOUT: 8567 FT | | | | | | (SL-J/LM) | - H ₂ O relief line temperature problem |
| 7 | 1 1 | SE . | SE PTM (U/S 476) | 49 SECS | 1 200 | 41 | | | | GBA-12 GAS | Ku-band range rate /Azimuth display failure. - APU 1 and 3 drain line temps cycling low. |
| DAV | TO CONTRACT OF THE PARTY OF THE | MOT | 7:07 ` 7:08 | WINDS: | | | Y | | 7 | MIDDEON | - APU 1 and 3 drain line temps cycling low. |
| | S JEMISON | | MECO CMD: | WINDS: H 0.9, L 1.8 KTS OFFICIAL: H2, L3 | | | 1 | | | MIDDECK: ISAIAH | - RMLG line temperature high Loss of MCC power buses B1 and B2. |
| | | | 8:31 8:34 | OFFIČIAL: H2, L3 | | | The state of | The state of | . Cold | SSCE | - LOSS OF NICC POWER DUSES BY AND BZ. |
| | | MCC FCR-1 (30) | 0.04 | DENS ALT: 1805 FT | | | | | | SAREX-II | |
| | | , , | MECO VI: | | STS047 | -09-009 | 1992-00 | 9-20 Crew i | n | | |
| | | FLIGHT DIRECTORS: | 25830 25827 | FLT DURATION: 7:22:30:22 | | | | cience mod | | 4 CRYO TK SETS | ← Tokyo |
| | | Asc/Ent - N. W. Hale Ld/O 2 - J. M. Heflin | <u>OMS-2</u> : | 190:30:22 | | | | | Juie | DWC 38 (2 VI 3U3) | TORYO |
| | | O 1 - G. A. Pennington | 36:11 36:12 | <u>S/T</u> : 323:13:44:53 | | | | t, back row | | RMS 28 (S.N. 303) (NOT USED | |
| | | O 3 - L. J. Ham | 262 FPS 262 FPS | | | | | wn; middle | | PER PLAN)) | |
| | | MOD - G. E. Coen | | OV-105: 16:19:48:01 | row, Da | vis/MS, A | Apt/MS. | & | | <i>"</i> | |
| | | | | | | | | ow, Lee/MS | S | | |
| | | | | DISTANCE: 3,310,922 sm | | | |) NASDA. | | | STS047-76-078 |
| | | | | J,J 1U,722 SIII | I LO & IV | 10111/1-3 | Japan | , וארטטרג. | | | |

| | | | 01 / | OL OHO | | MOOI | 0110 | OOM | • • • • • • • • • • • • • • • • • • • | \ 1 | |
|-----------------|--|--|---|---|--------------------|------------------|--|--|---------------------------------------|--|--|
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
| | | (6) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | | | WINDS | ENG. S.N. | | | | | | |
| STS-52 | OV-102 | CDR: | KSC 39, PAD B 296:17:09:38.97Z | KSC 33 (KSC 13) | 104/104/ 109% | BI-055 | 28.46° | DIRECT INSERTION | OI-21 | CARGO: 26862 LBS | KSC W/D: OPF 72, VAB 5, PAD 27=104 days |
| 050 51 7 | (Flight 13) Columbia | James D. Wetherbee (Flt 2 - STS-32) | 11:16:00 AM EDT (P) | 306:14:05:53Z 9:05:53 AM EST | 109% | RSRM | (30) | INSERTION | (5) | 20802 LBS | LAUNCH POSTPONEMENTS: |
| SEQ FLT #51 | Coldifibia | P277/R108/V80/M97 | 01:09:39 PM EDT (A) | Sunday 9 | PREDICTED | 27K | | POST OMS-2 | | PAYLOAD | - Launch date was 9/24/92 on 8/21/91. |
| πJI | | | Thursday 13 | 11/1/92 (7) | 100/100/ | | | 162.7 X | | PAYLOAD CHARGEABLE: 20132 LBS | - Launch postponed to 10/15/92 on 6/10/92. |
| KSC-51 | | PLT: Michael A. Baker | 10/22/92 (6) | DEORBIT BURN: | 100/67/104 | ET-55 | | 160.2 NM | | 20132 LBS | - Launch postponed to 10/22/92 on 10/10/92 due to engine |
| | | (Flt 2 - STS-43) P278/R133/V81/M118 | LAUNCHAMINDOM | 306:13:11:59Z | ACTUAL | LWT-48 | | LACEOC | | DEPLOYED: 5577 LBS | 3 steerhorn weld anomaly. |
| PAD | OMS PODS | P2/8/R133/V81/W118 | LAUNCH WINDOW 2H 30M CTOB | | ACTUAL 100/100/ | ET | | LAGEOS DEPLOY: | | 5577 LBS | LAUNCH SCRUB: None. |
| 39B-17 MLP-3 | LPO5 - 2 | M/S 1: | 211 30W C 1 O D | XRANGE: 223 NM | 95/67/104 | <u>ET</u> RPT | | 169.5 X | | NON-DEBLOYED: | LAUNCH SCROD. None. |
| IVILP-3 | RPO5 - 2 | Charles (Lacy) Veach | EOM PLS: KSC | ORBIT DIR: DL 25 | 70/07/101 | 10.1 | | 161.1 NM | | NON-DEPLOYED: 12475 LBS | LAUNCH DELAYS: |
| | FRC2 - 13 | Charles (Lacy) Veach (Flt 2 - STS-39) | TAL: BYD | <u>aim pt</u> : Nominal | 1 = 2030 (8) | <u>ET</u> | | 0/20:47:45 | | MIDDECK. | - Delayed for 1H53M39S because of RTLS crosswind |
| | | P279/R127/V82/M114 | TAL WX: MOR, BEN | | 2 = 2015 (9) | BR/UP | | OMC / | | MIDDECK: 2080 LBS | exceedance (15-knot limit). A range safety warning |
| | | M/S 2: | SELECTED: | MLGTD: 1080 FT | 3 = 2034 (1) | ET | | OMS-6: 154.2 X | | | (BLAST) existed for part of launch hold. MMT waived crosswind exceedance (0613G21 on center tower). |
| | | W/3 Z. William M. Shepherd | <u>SELECTED</u> : <u>RTLS</u> : KSC 15/N/N | VEL: 219 KGS | | IMPACT | | 114 NM | | SHUTTLE ACCUMULATED | crosswind exceedance (0013021 officenter tower). |
| | | (Flt 3 - STS-27, STS-41) | TAL: BYD 32/N/SF | MLGTD: 1080 FT 306:14:05:53Z VEL: 219 KGS 211 KEAS HDOT: -0.3 FPS | M 3 EOM | LAT: | | 7/19:59:55 | | WEIGHTS: | TAL WX: |
| | | P280/R96/V56/M87 | AOA: EDW 22/N/N | | WEIGHT: | 12.9°S | | | | SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 678815 LBS NON-DEPLOYED: | - Prime TAL Banjul had reduced short range visibility but was forecast and observed GO and selected. Moron was |
| | | MAIC 2 | PLS: EDW 04/CI/N | TD NORM 195: 2819 FT | 216043 LBS | LONG: | | OMS-7: | | 0/8812 FR2 | was forecast and observed GO and selected. Moron was |
| | | M/S 3: Tamara E. Jernigan | TDEL: | 2819 F I | X CG: 1082.6 | 163.4°W | | 114.1 X 113.9 NM | | 641371 LBS | forecast and observed NO GO because of low ceiling. Ben |
| | | (Flt 2 - STS-40) | - 0.16 - 0.438/0.4 | DRAG CHUTE | 1002.0 | | | 7/20:46:26 | | 641371 LBS CARGO TOTAL: | Guerir was NO GO during most of prelaunch period because of ceilings and threat of rain, but was observed |
| | | P281/R130/V83/F14 | 0.10 | DEPLOY: 169 KEAS | LANDING | | | 7720.10.20 | | 1509962 LBS | GO when rain moved away from runway. |
| | | | MAX Q NAV: | 306:14:06:06Z | WEIGHT: | | | <u>DEORBIT</u> | | PERFORMANCE MARGINS (LBS): | , , |
| | A | P/S 1: | 717 PSF 708 PSF | NLGTD: 6949 FT | 215935 LBS | | | 113 X | | MARGINS (LBS): | DOLILU/I-LOADS: |
| | | Steven MacLean (Canada) | SRB STG: | 306:14:06:11Z VEL: 151 KGS | X CG: 1084. | | | 110 NM | | FPR: 4671 FUEL BIAS: 983 FINAL TDDP:11107 | - Both nominal and DOLILU (Q-Alpha-4000) for aero DTO. Alternate (Q-Alpha-3250) to backout DTO. Selected |
| HERB | EE BAKEA | P282/R156/M138 | 2:03.8 2:05 | VEL: 151 KGS HDOT: - 3.5 FPS | 1004. | | | VELOCITY | | FINAL TDDP:11107 | DOLILU, DOLILU uplink #4, total uplink #11). |
| HET. | <u> </u> | (h) | | BRK INIT: 101 KGS | | | | 25666 FPS | | RECON: 9801 | |
| 2 : . | | 3 | <u>PERF</u> : NOMINAL | | | | | | | PAYLOADS: | FLIGHT DURATION CHANGE: None. |
| HE | | MCC FCR-1 (31) | 2 ENC TAL (DVD). | DRAG CHUTE JETTISON: 51 KGS | | | | ENTRY | | PLB: | LANDING CITE CHANCE, None |
| H. | | FLIGHT DIRECTORS: | 2 ENG TAL (BYD): 2:23 2:26 | 306:14:06:36Z | | | | RANGE 4454 NM | | LASEK GEODYNAMICS | LANDING SITE CHANGE: None. |
| S . | | Asc/Ent - J. W. Bantle | 2.20 | AVE BRK DECEL: | | | | TTOT IVIVI | | PATLOADS. PIB: TASER GEODYNAMICS SATELLITE (LAGEOS-II) (DEPLOYED) | DRAG CHUTE STRATEGY: |
| 04 . | | Ld/O 1 - R. E. Castle | <u>NEG RETURN</u> : 4:05 4:09 | 5.7 FPS/S | | | | 1 | | (LAGEOS-II) | - Deploy nose in air at 175 kgs/derotation if |
| 1 | | O 2 - R. D. Jackson | 4:05 4:09 | | | | | | | | crosswinds ≤ 5 kts steady state and nose within ± 10 |
| | | Planning - C. W. Shaw MOD - A. L. Briscoe | DTA (II/C 22E). | WHEELS STOP: 306:14:06:55Z | 4000 | | de | | | CTA DEPLOYED | of center line. Dis-reef would occur at touchdown. Drag chute was deployed at 170 KGS (chute deploy |
| | | WOD - A. L. BIISCOE | PTA (U/S 235): 4:22 4:25 | 11788 FT | 180 | | 5 | | | CTA DEPLOYED (CANADIAN TARGET ASSY) | #4), chute pulled left and nose went to right. |
| LEAST TEAM | - Canes | NAGO ST | 1.22 7.23 | ROLLOUT: | | | - | | | | " 17, Shate paired for and hose work to right. |
| | The state of the s | Serie Crutter | PTM (U/S 235): | ROLLOUT: 10708 F I | | | 1 | | | CANEX-2/TPCE, | SIGNIFICANT ANOMALIES: |
| | | | 5:08 5:09 | 63 SECS | | - | No. of Concession, Name of Street, or other Persons, Name of Street, or ot | | | USMP-01 ASP | - WCS fan separator 1 failed to operate FD 10. |
| 399 | | | MECO CMD: | WINDS: | | 1 | 1 | | | | - Fuel cell 1 cell performance monitor hangup. - F3L failed off (oxidizer leak). |
| | · · · · · · · · | | 8:29.82 8:32 | T-4, R 5 KTS OFFICIAL: H3, L8 | 148.7 | 100 | | The state of the s | | MIDDECK: | - PRSD O ₂ tank 2 heater A2 erratic. |
| | 2 | | 0.02 | OFFICIAL: H3, L8 | -i. | 2- 5-6 | 1000 | | | MIDDECK: PSE HPP CPCB BLOCK II | - TAGS hard iam no developer motor motion |
| 11 12 | 1 | 907 | <u>VI</u> : | <u>DENS ALT</u> : 1643 FT | 5 | 1 | A VA | 1 | | CPCB BLOCK II | - Intermittent surface position indicator (SPI) power. |
| | | | 25 875 25874 | FLT DURATION: | 881 | | | V. C. | | ISPIE | - S-band PM low frequency forward link loss of lock. |
| | an, | (E) | OMS-2: | FLT DURATION: 9:20:56:13 | | | - | () | | CMIX CVTE | - S-band FM transmitter RF power output erratic. - Window 3 internal "void" or "bruise" (R&R). |
| | | | 39:56 39:56 | 236:56:13 | | _ | | | | CANEX | - williagw 5 internal volu of braise (trait). |
| - | | - | 215 FPS | <u>S/T</u> : 333:10:41:06 | | 30-024 19 | | | | 5 CRYO TK SETS | |
| * | | | | | | | | RIS), a spinn | ing | | |
| CTCOE2 25 | 00E 1002 1 | 1.01 In orbit grow portroit | | OV-102: 98:17:40:41 | solid fuel | rocket, lift | ts the La | aser | | RMS 29 (S.N. 301) USED FOR CTA DEPLOY | |
| | | 1-01 In orbit crew portrait. | | DISTANCE: | Geodyna | mic Satell | ite II (LA | AGEOS II) ou | ut of | ČŤĀ ĎĖPĹOY | |
| Capilon una | valiable, see | names above. | | 4,129,028 sm | its suppo | | | | | | |
| | | | | ., | | | | | | | |

| | | | <u> </u> | CE OHO | | | 0110 | | | • | Page 2-62 - \$15-53 |
|--|---|--|--|---|-----------------------|----------------|-------------|-----------------------|--|--------------------------------|--|
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
| | | (5) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | (| ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | TITLE MANES | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | 1110 | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, WINDS | PROFILE ENG. S.N. | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-53 | OV-103 | CDR: | KSC 39, PAD A | EDW 22, CONC | 104/104/ | BI-055 | 57° | DIRECT | OI-21 | CARGO: | KSC W/D: OPF 247, VAB 5, PAD 24 = 276 days |
| 313-33 | (Flight 15) | David M. Walker | 337:13:24:007 | (EDW 37,CONC 18) | 109% | | (12) | INSERTION | (6) | 28316 LBS | LAUNAU DO OTRONENTA |
| SEQ FLT | Discovery | (Flt 3 - STS 51-A & STS-30) | 6:59:00 AM EST (P) 8:24:00 AM EST (A) | 344:20:43:47Z 12:43:47 PM PST | PREDICTED: | RSRM 28W | | DOCT OMC 2 | | DAVLOAD | LAUNCH POSTPONEMENTS: - Launch date was 10/9/92 on 3/15/91. |
| #52 | | P283/R48/V40/M45 | Wednesday 7 | Wednesday 5 | 100/100/ | 28VV | | POST OMS-2 200 X | | <u>PAYLOAD</u> CHARGEABLE: | - Launch postponed to 11/5/92 on 6/10/92 when decision |
| KSC-52 | OMS PODS | | 12/2/92 (3) | 12/9/92 (6) | 100/70/ | ET-49 | | 199 NM | | 26118 LBS | made to fly STS-52 before STS-53. |
| | LPO4-12 | PLT: Robert D. Cabana | LALINGLUMINDOM | DEORBIT BURN: | 104/67 | LWT-42 | | DOD 1 | | DEDLOVED: | - Postponed launch to 12/2/92 due to LP04 replacing LP01, engine steerhorn Xrays, and NWS anomaly. |
| <u>PAD</u> 39A-35 | RPO3-16 FRC3-15 | (Flt 2 - STS-41) | LAUNCH WINDOW 2H 30M CTOB | DEORBIT BURN: 344:19:43:20Z | ACTUAL: | FT | | DOD-1 DEPLOY: | | <u>DEPLOYED</u> : 20789 LBS | engine steemon Arays, and NWS anomaly. |
| 39A-35 MLP-1 | 1105-15 | P284/R113/V84/M101 | 211 30W C 1 O D | XRANGE: 791 NM | 100/100/ | ET RPT | | 00/05:54 MET | | (NO ODERACS | LAUNCH SCRUB: None. |
| | | 1410.4 | EOM PLS: KSC | ORBIT DIR: DR 8 | 100/73/ | | | 200 X | | DEPLOY) | LAUNCH DELAYS: |
| | | M/S 1: Guion S. Bluford | TAL: ZZA TAL WX: MRN, BEN | AIM PT: CLOSE IN | 104/67 | ET BR/UP | | 199 NM | | NON-DEPLOYED: | - Delayed 1H25M at T-9 minutes because of acreage ice |
| | | (Flt 4 - STS-8, | · · | MLGTD: 1108 FT | 1 = 2024 (5) | DIVOL | | SEP BURN: | | 4299 LBS | on ET which ice team confirmed melted approx. 35 |
| | | STS 61-A & STS-39) | SELECTED: RTLS: KSC 33/CI/N | 344:20:43:47Z | 2 = 2012 (14) | ET | | 00/06:14MET | | (INCLUDES | minutes after sunrise. Addi-tional delay caused by wing LA16 exceedance of 102% based on L-70 minutes and |
| | | P285/R22/V25/M21 | TAL: BEN 36/N/N | 344:20:43:47Z VEL: 209 KGS 212 KEAS | 3 = 2017 (7) | IMPACT LAT: | | 204 X 200 NM | | ÒDERACS) | DOLILU I-loads. |
| | | M/S 2: | AOA: NOR 17/N/N | HDOT: -2.5 FPS | | 40.95°S | | 200 INIVI | | MIDDECK: | TAL MANY |
| | | James S. Voss | PLS: NOR 17/CI/N | TD NORM 195: | <u>M 3 EOM</u> | LONG: | | OMS-3: | | MIDDECK: 1030 LBS | TAL WX: - Zaragoza was prime but forecast intermittent GO (ceiling |
| | | (Flt 2 - STS-44) P286/R136/V85/M121 | TDEL | 2682 F I | WEIGHT: | 152.6°W | | 01/06:19:12 202 X | | SHUTTLE | and rain) but observed GO. Moron forecast NO GO - |
| | | F 200/K 130/ V 03/IVI 12 I | TDEL: 0.722/0.766 | DRAG CHUTE DEPLOY: 167 KEAS | 194028 LBS | | | 175 NM | | ACCUMULATED | ceiling, observed marginal GO. Ben Guerir forecast and |
| | | <u>M/S 3</u> : | | <u>DEPLOY:</u> 167 KEAS 344:20:44:00Z | | | | | | WEIGHTS: | observed GO (selected). |
| | | Michael R. Clifford P287/R157/M139 | MAX Q NAV: 692 PSF 705 PSF | | X CG: 1089.5 | | | OMS-4: 01/07:02:03 | | DEPLOYED: 699604 LBS | DOLILU/I-LOADS: |
| | | P28//K15//W1139 | 092 PSF /00 PSF | NLGTD: 6329 FT 344:20:44:03 67 | 1089.5 | | | 176 X | | NON-DEPLOYED: | - Nominal and DOLILU I-loads were GO on L-4.25 balloon. |
| | â | | <u>SRB STG</u> : 2:05.6 2:06 | 344:20:44:03.6Z VEL: 145 KGS | LANDING | | | 175 NM | | 646700 LBS | DOLILU was selected and uplinked. DOLILU uplink #5, total 12. |
| OLKEN | CABA. | MCC FCR-2 (21) | 2:05.6 2:06 | HDOT: -2.2 FPS | WEIGHT: | | | (ODERACS | | CARGO TOTAL: | |
| WA | TAVA | FLIGHT DIRECTORS: | PERF: NOMINAL | BRK INIT: 106 KGS | 193851 LBS X CG: | | | DEPLOY ALT) | | 1538278 LBS | FLIGHT DURATION CHANGES: - Planned extension of flight from 6 to 7 days, if launch was |
| | | Asc/Ent - N. W. Hale | | DRAG CHUTE | 1091.3 | | | OMS-5: | | <u>PERFORMANCE</u> | delayed, to provide night passes for GLO experiment. |
| E S | / /\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\ | Ld/O 2 - R. M. Kelso | 2 ENG TAL (MRN): | <u>JETTISON: 60</u> KGS 344:20:44:25Z | DEODDIT | | | 05/05:51 | | MARGINS (LBS): | - Extended one rev because forecast 3.5K broken on first |
| 0.36 | | O 1 - J. M. Heflin Planning - L. J. Ham | 2:32 2:33 | AVE BRK DECEL: | DEORBIT 174 X | | | 174.9 X 170.3 NM | | FPR: 3934 FUEL BIAS: 1055 | KSC landing opportunity. |
| 8 | | MOD - B. R. Stone | NEG RETURN: | 3.5 FPS/S | 169 NM | | | (2ND KSC | | FINAL TDDP:1368 | LANDING SITE CHANGES: |
| V | oss | | 4:04 4:06 | WHEELS STOP: | VELOCITY | | | ĹANDING | | RECON: 2844 | - Changed landing site to EDW after waving off first |
| | | | PTA (U/S 350): | 344:20:44:59Z | VELOCITY 25813 FPS | | | EOM +1) | | PAYLOADS: | opportunity at KSC and forecast NO GO (ceiling on second |
| STS053-1 | 3-021 1992 | 2-12-09 In orbit crew | 4:56 4:52 | 11273 FT | | | | Acquisition & | | PLB: | landing opportunity at KSC). |
| | | aft flight deck | DTM (II/C 250) | ROLLOUT: 10165 FT | | | | ARE) middeck | | DOD-1 (DPLY) | FIRSTS/LASTS: |
| (Caption u | unavailable, | , see names above). | PTM (U/S 350): 5:48 5:41 | 82 SECS | | | | vs the fluid mixtur | | GCP ODERACS (FAILED | - First flight of OV-103 after OMDP-1 with drag chute, INWS, etc. |
| | | | 3.40 | WINDS: | 4237 WW | and transier | process iii | transparent sphe | ie. | TO DEPLOY) | - Last flight from FCR-2. |
| 7 | | W. C. Z. | MECO CMD: | H9, R11 | | | - | | | , AIDDEON | CICNIFICANT ANOMALIEC |
| | | | 8:33.48 8:34 | 2614P19 <u>OFFICIAL:</u> H15, R8 | | 111 | THE RESERVE | | - | MIDDECK: HERCULES, | SIGNIFICANT ANOMALIES: - HPOT secondary seal transducer failure. |
| 1 . | | | VI: | DENS ALT: 2961 FT | l le | 1_/ | | - man | 1 | | - Humidity separator B water deposits. |
| | 1-10 | | 25 885 25885 | FLT DURATION: | 11 | · 1/6 | | | | STL, BLAST, | - Supply water dump valve water leaks. |
| | 1 | | OMS 2: | 7:07:19:47 | 10 | - | | | - 1 | RME III, CLOUDS-1A, | - Couldn't deploy ODERACS space spheres because logic battery was discharged (160 lbs). |
| | | 1 1000 | OMS-2: 37:03 36:53.6 | 175:19:47 | | | | | | CREAM, | - Speedbrake FCS channel 3 position feedback anomaly F1L jet fail leak post FRCS dump (O ₂ leak). |
| | | | 337.3 FPS337.5 FPS | <u>S/T</u> : 340:18:00:53 | 7 | | | | | FARE | - F1L jet fail leak post FRCS dump (O₂ leak). |
| | | | | OV-103: 90:10:42:50 | | | + + | THE TOTAL | 1 | 4 CRYO TK SETS | - PPO ₂ C transducer shift Water spray boiler 1 steam vent heater anomalous cycles. |
| | 700 | 9 (=) | | | | - | | | 24 | 4 UKTU IK SEIS | - water spray boller i steam vent heater anomalous cycles. |
| E STATE OF THE STA | | | | DISTANCE: 3,034,680 sm | - | | | | No. of Concession, Name of Street, or other Persons, Name of Street, or other Persons, Name of Street, Name of | NO RMS | EVENTS: |
| | 100 | | | 3,034,000 3111 | | | V. | | | | - DOD-1 deployed at 00/05:54 MET. - Lowered orbit to 176 nm for ODERACS deploy. |
| | | | | | | | | | | | LOWGICA OIDILLO 170 HILLIOI ODENAOS ACPIOY. |

| | | | 017 | OL OITO | | 11001 | 0110 | OOM | VI/ XI | \ 1 | |
|---------------------------------|----------------------|---|------------------------------------|--|---------------------------|-------------------------|--|---------------------|--------------|-------------------------------|--|
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
| | | (5) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | 1 | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | | | WINDS | ENG. S.N. | | | | | | |
| STS-54 | OV-105 (Flight 3) | CDR: John H. Casper | KSC 39, PAD B 13:13:59:29.95Z | KSC 33 (KSC-14) 19:13:37:47Z | 104/104/ 109% | BI-056 | 28.45° (31) | DIRECT INSERTION | OI-21 (7) | <u>CARGO</u> : 49039 LBS | <u>KSC W/D</u> : OPF 55, VAB 6, PAD 27 = 88 days |
| CEO ELT | Endeavour | (Flt 2 - STS-36) | 8:52:00 AM EST (P) | 8:37:47 AM EST | 109% | RSRM | (31) | INSERTION | (1) | 49039 LD3 | LAUNCH POSTPONEMENTS: |
| SEQ FLT #53 | Lilacavoai | P288/R111/V86/M99 | 8:59:30 AM EST (A) | Tuesday 9 | PREDICTED: | 29W | | POST OMS-2 | | PAYLOAD | - Baselined launch date of 11/19/92 on 4/4/91. |
| 11 33 | | | Wednesday 8 | 1/19/93 (5) | 100/104/ | | | 164 X | | CHARGEABLE: | - Postponed launch date to 12/15/92 on 5/8/92. |
| KSC-53 | | <u>PLT</u> : | 1/13/93 (6) | DEORBIT BURN: | 99/70/ | ET-51 | | 160 NM | | 46540 LBS | - Postponed launch date to 1/13/93, after holi-days, to allow |
| DAD | | Donald McMonagle (Flt 2 - STS-39) | LAUNCH WINDOW | 19:12:38:10Z | 104/67 | LWT-44 | | | | DEPLOYED: | the required OPF processing time. |
| <u>PAD</u> 39B-18 | OMS PODS | P289/R126/V87/M113 | 2H30M, CTOB | XRANGE: 320 NM | ACTUAL: | FT | | SEP BURN: | | 37497 LBS | LAUNCH SCRUB: None. |
| MLP-2 | LPO3-14 | | | | 100/104/ | <u>ET</u> RPT | | OMS-3: 173 X | | | |
| WEI 2 | RPO4-10 | <u>M/S 1</u> : | EOM PLS: KSC | ORBIT DIR: DL 26 | 104/72/ | | | 173 X | | NON-DEPLOYED: | LAUNCH DELAYS: |
| | FRC5-3 | Gregory J. Harbaugh (Flt 2 - STS-39) | TAL: BEN TAL ALT: BYD, MRN | AIM PT: CLOSE IN | 104/67 | <u>ET</u> BR/UP | | 160 NM | | 7991 LBS | - Delayed 7M30S while holding at T-9 minutes while discussing load indicator A16 Q-plane exceedance (101%) |
| | | P290/R125/V88/M112 | TAL ALT. DTD, WKN | MI GTD: 1536 FT | 1 = 2019(11) | DR/UP | | OMS-4: | | MIDDECK. | at M=1.55. Approved a waiver. |
| | | | SELECTED: | 19:13:37:47Z | 2 = 2033(2) | ET | | 14:16:08:42Z | | MIDDECK: 1052 LBS | at W-1.55. Approved a waiver. |
| PER MO | CMONAC | <u>M/S 2</u> : | RTLS: KSC 33/N/N | VEL: 205 KGS | 3 = 2018 (9) | IMPACT | | 164 X | | | TAL WX: |
| S. | | Mario Runco (Flt 2 - STS-44) | TAL: BEN 36/N/N AOA: NOR 17/N/N | MLGTD: 1536 FT 19:13:37:47Z VEL: 205 KGS 212 KEAS HDOT: -1 FPS | (2018 WAS | <u>LAT</u> : 12.92°N | | 163 NM | | SHUTTLE ACCUMULATED | - Ben Guerir and Moron forecast and observed GO. Banjul forecast and observe NO GO - VIS (haze). |
| al . | D | P291/R137/V89/M122 | PLS: NOR 17/N/N | | REBUILT) | LONG | | MET | | WEIGHTS: | lorecast and observe NO GO - VIS (naze). |
| * | UNIC | | | TD NORM 195: 2710 F I | ' | 163.3°W | | 1:02:08:42 | | DEPLOYED: | DOLILU/I-LOADS: |
| * | Š Š | <u>M/S 3</u> : | TDEL: -0.32 0.322/0.36 | | M 3 EOM WEIGHT: | | | | | 737101 LBS | - DOLILU selected and uplinked. DOLILU #6, total uplink |
| 7 | White S | Susan J. Helms P292/R158/F19 | -0.32 0.322/0.36 | DRAG CHUTE DEPLOY: 166 KEAS | WEIGHT: 197481 LBS | | | DEORBIT 165 X | | NON-DEPLOYED: 655743 LBS | #13. |
| * HE | WS HARD! | F 2 9 2 / K 1 3 0 / 1 1 9 | MAX Q NAV: | 19:13:38:00Z | X CG: | | | 159 NM | | CARGO TOTAL: | FLIGHT DURATION CHANGES: None. |
| | | EMU/TETHERED EVA: | 709 PSF 715 PSF | NLGTD: 6247 FT | 1091.6 | | | | | 1587317 LBS | |
| MCC FCR-1 | (32) | EV1 - Greg Harbaugh | CDD CTC | 19:13:38:02Z | LANDING | | | VELOCITY | | DEDECOMANGE | FIRSTS: |
| | , | EV2 - Mario Runco 1/17/93 | SRB STG: 2:05.1 2:06 | VEL: 150 KGS HDOT: -3.1 FPS | <u>LANDING</u> WEIGHT: | | | 25780 FPS | | PERFORMANCE MARGINS (LBS): | - First flight with a planned fuel cell shut-down/restart. FC2 shut down for 10 hours per DTO 412 at 04/20:00 - First flight of EDO Waste Collection System (WCS). |
| FLIGHT DIRE Ascent - J. W | | 4:27:50 Duration | 2.00.1 2.00 | | 197353 LBS | | | ENTRY | | FPR: 3934 | - First flight of EDO Waste Collection System (WCS). |
| Entry - R. D. | Jackson | | PERF: NOMINAL | BRK INIT: 107 KGS | X CG: | | | RANGE | | FUEL BIAS: 1055 | - First Military Woman in Space - Susan J. Helms |
| Ld/O2 - P. L. | Engelauf | SS EVA #20 | O ENIC TAL (DEN) | DRAG CHUTE JETTISON: 52 KGS 19:13:38:23Z | 1093.4 | | | 4213 NM | | FINAL TDDP:2659 | CICNIFICANT ANOMALIEC |
| 01-C.W.S | | REFINE TRAINING METHODS FOR SPACE | 2 ENG TAL (BEN): 3:00 3:06 | 19:13:38:23Z | | | | | | RECON: 3421 | SIGNIFICANT ANOMALIES: - EDO WCS commode, urinal, and compactor microswitch |
| Plan - J. W. M MOD - A. L. E | nuiutoic | STATION EVA'S | | AVE BRK DECEL: | | | 4 | CAXXXX | | PAYLOADS: | problem. |
| IVIOD - A. L. D | onscoe | | NEG RETURN: | 7.3 FPS/S | - S-15-1 | | 28 | | 4 | PLB: | - PLB floodlights problems: Both mids and fwd starboard. - R1R jet failed off during RCS hot fire. |
| 0-0 | | | 3:57 4:00 | | | | 1870 | | | TDRS-F/IUS | - R1R jet failed off during RCS hot fire. |
| | | orbit crew portrait | DTA (II/S 235). | WHEELS STOP: 19:13:38:36Z | 100 | | - | 4 | | (DEPLOYED) DXS | - Rudder speedbrake secondary hydraulic switching valve indication. |
| | | ble) Susam Helms, | PTA (U/S 235): 5:12 5:14 | 19:13:38:36Z 10259 FT | 11000 | | 74 | | 5 | | - Hydraulic sys 3 residual pressure post APU shutdown. |
| 1st Milita | iry Womar | n in space, at top. | | ROLLOUT: | 100 | | And A | 机化生物 | i i | MIDDECK: CHROMEX | Hydraulic sys 3 residual pressure post APU shutdown. APU 3 overheat during ascent (WSB 3 not cooling). |
| | | | PTM (U/S 235): 5:54 5:56 | ROLLOUT: 8723 F I 49 SECS | 8 (14) | 950 | - Carrie | | | CHROMEX CGBA | - DOLILU GPC dump display format error. |
| | | | 0:04 0:00 | | 70 72 | 16 | 1 | | | PARE | - EVA - No hitch pin in PFR pip-pin. - R RSRM had 18 psi chamber pressure spike at 67 |
| | | | MECO CMD: | WINDS: 4H, R2 | 3.000 | | N | 6 | 4 | SSCE | seconds. |
| | | | 8:28.66 8:30.6 | OFFICIAL: | | | JA 1 | | 8 | | |
| | 3 1 6 | | VI: | H3, R2 | | 130 250 | | | | 4 CRYO TK SETS | EVENTS: TDDS E deployed at 06:12:57 MET |
| | | | <u>vi.</u> 25876 25872 | DENS ALT: -151 FT | | 1 150 | VI MA | | | NO RMS | - TDRS-F deployed at 06:12:57 MET. - OMS4 to bring in additional ldg opportunities. |
| | 10 | | | FLT DURATION: | 100 | 2 | | | | | - EVA started at 03:20:50:25 MET. |
| | 3 133 (| 3 | OMS-2: | 5:23:38:17 | | | | 10 | щ | | - Deorbit burn on rev 95, landing rev 96. |
| | 1 | | 39:53 39:53 | 143:38:17 | | | | 1 | | | NOTE: SSME 2018 was rebuilt to new engine status. |
| | 80 | Alle Alle | | <u>S/T</u> : 346:17:39:10 | 12.11.12 | 6 | 11. | The second second | | | THO FE. COME 2010 Was repaire to new engine status. |
| 7 - 4 | | | | OV-105: | | | | | | Top: STS054- | 80-000U DTO 1210 EVA : Harbaugh |
| | | | | 22:19:26: 18 | | 1 | | | | carries Runco | |
| | - | | | DISTANCE: | 7 | | | THE PERSON NAMED IN | | | 54-71-025 TDRS/IUS Deploy |
| | | | | 2501 277 sm | | 47 | MA TO SERVICE OF THE PARTY OF T | 1 4 | | 20110.711 0100 | <u></u> |

DISTANCE: 2,501,277 sm

CDACE CHITTIE MICCIONIC CHMMADV

| | | | SPA | CE SHU | ITLE N | /IISSI | ONS | SUMN | IA F | RY | Page 2-64 - STS-56 |
|----------------------|--------------------------|--|--|---|-------------------------------|---------------------------|----------------|-------------------------|-------------|---|--|
| | | CREW | LAUNQUICITE | LANDING SITE/ | SSME-TL | CDD | | ODDIT | | DAVILOAD | MICCION LIIGUII IOUTO |
| FLT | ORBITER | (5) | LAUNCH SITE, LIFTOFF TIME, | RUNWAY, CROSSRANGE | NOM-ABORT EMERG | SRB RSRM | (| ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | ORBITER | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | 1 3 4 4 | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| 140. | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | IIVC | TIATI | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | | | WINDS | ENG. S.N. | | | | | | |
| STS-56 | OV-103 | CDR: | KSC 39, PAD B | KSC 33 (KSC-15) | 104/104/ | BI-058 | 57° | DIRECT | OI-21 | CARGO: | KSC W/D: OPF 63, VAB 10, PAD 22 = 95 days |
| CEO ELT | (Flight 16) Discovery | Kenneth D. Cameron (Flt 2 - STS-37) | 98:05:28:59.95Z | 107:11:37:19Z 7:37:19 AM EST | 109% | RSRM | (13) | INSERTION | (8) | 21000 LBS | LAUNCH POSTPONEMENTS: |
| SEQ FLT #54 | 1 | P293/R121/V90/M109 | 1:29:00 AM EDT (P) 1:29:00 AM EDT (A) | | PREDICTED: | RSRM 31KM | | POST OMS-2 | | PAYLOAD CHARGEARIE: | - Launch date of 3/23/93 was postponed to 4/6/93 because |
| | Eleventh | DI T. | Thursday 14 | Saturday 10 | 100/100/ | ET EA | | 159.8 X | | CHARGEABLE: 16439 LBS | - Launch date of 3/23/93 was postponed to 4/6/93 because of STS-55 launch delays which were caused by SSME HPOTP tip seal retainer problems, hydraulic flex hoses, |
| KSC-54 | Spacelab Flight | PLT: Stephen S. Oswald | 4/8/93 (9) | 4/17/93 (8) | 89/67/104 | ET-54 LWT-47 | | 159.1 NM | | DEPLOYED: | and range conflicts with Delta and Atlas launches. |
| PAD | Igloo (4) | (Flt 2 - STS-42) | LAUNCH WINDOW Closes on ATMOS | DEORBIT BURN: 107:10:34:25Z | ACTUAL: 100/100/ | | | DEPLOY: | | 0 LBS | _ |
| <u>PAD</u> 39B-19 | OMS DODS | P294/R139/V91/M124 | Closes on ATMOS | | 100/100/ 89/69/104 | <u>et</u> RPT | | 161.1 X 158.2 NM | | NON-DEPLOYED: 12568 LBS | LAUNCH SCRUB: - Launch on 4/6/93 was scrubbed after an RSLS breakout |
| MLP-1 | OMS PODS LPO1-19 | M/S 1: | Tangent Ray Constraint - 2H28M | XRANGE: 6 NM | 07/07/104 | | | 130.2 INIVI | | | at T-11 seconds caused by failure to get "close" indication |
| | RPO3-17 | C. Michael Foale | | ORBIT DIR: DL 27 | 1 = 2024 (6) | <u>ET</u> <u>BR/UP</u> | | RNDZ: | | MIDDECK: 1031 LBS | when LH ₂ high point bleed valve closed. |
| | FRC3-16 | (Flt 2 - STS-45) P295/R143/V92/M127 | EOM PLS: KSC TAL: ZZA | <u>aim PT</u> : Close in | 2 = 2033 (3) 3 = 2018 (10) | BR/UP | | 160.5 X 156.9 NM | | | LAUNCH DELAYS: None. |
| | | 1 275/1(145/ \ 72/\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\ | TAL ALT: MRN, BEN | MLGTD: 1074 FT | 3 - 2010 (10) | <u>ET</u> | | 130.7 IVIVI | | SHUTTLE ACCUMULATED | |
| | | M/S 2: | CELECTED. | MLGTD: 1074 FT 107:11:37:19Z VEL: 196 KGS 206 KEAS HDOT: -2.5 FPS | M 3 EOM | <u>IMPACT</u> | | DEODDIT | | WFIGHTS: | TAL WX: All three TAL sites (ZZA, MOR, and BEN) were forecast and observed GO. ZZA selected. |
| | | Kenneth D. Cockrell P296/R159/M140 | SELECTED: RTLS: KSC 33/N/N | 206 KEAS | WEIGHT: 208052 LBS | <u>LAT</u> : 42.4°N | | <u>DEORBIT</u> 160 X | | DEPLOYED: 737101 LBS | Torecast and observed GO. ZZA selected. |
| | | | TAL: ZZA 30/CI/N | | X CG: | LONG: | | 150 NM | | NON-DEPLOYED: 669342 LBS | DOLILU/I-LOADS: |
| | | M/S 3: Ellen Ochoa | AOA: NOR 17/N/N PLS: EDW 22/N/N | TD NORM 195: 1948 FT | 1084.6 | 154.36°W | | VELOCITY | | 669342 LBS <u>CARGO TOTAL</u> : | - Nominal I-loads were selected (were uplinked because DOLILU I-loads had been uplinked for 4/6/93 launch |
| 5.7.0 | | P297/R160/F20 | (ORBIT 7) | | LANDING | | | 25797 FPS | | 1608317 LBS | attempt). |
| MER | ON OSWA | | EDW 04/CI/N | DRAG CHUTE DEPLOY: 169 KEAS | WEIGHT: | | | ENTDV | | PERFORMANCE | NIGHT LAUNCH: Shuttle night launch #8. |
| | | | (ORBIT 3) | 107:11:37:30Z | 207946 LBS X CG: | | | <u>ENTRY</u> RANGE | | PERFORMANCE MARGINS (LBS): FPR: 3934 FUEL BIAS: 1055 FINAL TDDP: 9521 | MOTT EAGNOT. Struttle Hight launch #0. |
| w Z | Coc | MCC FCR-1 (33) | TDEL: | NLGTD: 5587 FT | 1086.3 | | | 4375 NM | | FPR: 3934 FUEL BIAS: 1055 | FLIGHT DURATION CHANGES: |
| FOA | KAE | FLIGHT DIRECTORS: | 0.00 0.24 | NLGTD: 5587 FT 107:11:37:34Z VEL: 144 KGS | | Н | | | | FINAL TDDP: 9521 | - Waved off two landing opportunities at KSC because of forecast low ceiling at KSC. |
| | 5 8 | Ascent - J. W. Bantle | MAX Q NAV: | HDOT: -3.4 FPS | | A | | | | RECON: 10/18 | - Extended 1 day because WX forecast NO GO at KSC. |
| V 17 | Sto Och | Entry - R. D. Jackson | MAX Q NAV: 675 PSF 676 PSF | BRK INIT: 92 KGS | 47.64 | - // | | | | PAYLOADS: | FIRSTS: |
| | | Ld/O1 - C. W. Shaw O 2 - J. W. Muratore | SRR STG- | | | 44 | | 100 | | PLB: ATMOSPHERE LABORATORY FOR | - First flight with 90% reefed drag chute (same deploy |
| | | O 3 - R. E. Castle | <u>SRB STG</u> : 2:06 | DRAG CHUTE JETTISON: 55 KGS | | | | | | LABORATORY FOR | - First flight with 90% reefed drag chute (same deploy strategy). 90% more stable than baseline First TV uplink to American Spacecraft via SAREX-II (UHF |
| | | MOD - A. L. Briscoe | DEDE: NOMINAL | 107:11:37:59Z | | A A | - | CONTRACT OF | | AND SCIENCE | fast scan TV). |
| | | | PERF: NOMINAL | AVE BRK DECEL: 4.9 FPS/S | | | 31 | | | (ATLAS-2) SSBUV/A | |
| 11881 | | 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 2 ENG TAL (MRN): | | - August | | 4 | 1 | | ISPARTAN 201 | SIGNIFICANT ANOMALIES: - RSRM 7 to 8 psi pressure spike at 74 seconds. - Loose thermal blanket on aft (1307) bulkhead. |
| 1.// 333 | | | 2:24 2:26 | WHEELS STOP: 107:11:38:22Z 10603 FT | | | | | | (DEPLOYED & | - Loose thermal blanket on aft (1307) bulkhead. |
| 4 18 | 111 | | NEG RETURN: | 10603 FT | | | 47) | 300 | | RETRIEVED) GBP | - FC1 O₂ reactant valve falsely indicated closed. - FC1 substack 3 delta voltage increased during purges. |
| | 111 | | 4:10 4:13 | ROLLOUT: | ¥6 | 10 | 1 | 1 | | SUVE | - ATVC Channel 4 nower failure |
| 7/14 | W E | A STATE OF THE STA | PTA (U/S 280): | 9529 FT 63 SECS | Top: STS056- | 91-050 AT | LAS-2 pa | allet in PLB | | MIDDECK: | - Ku-band singed processor problem - Spacelab data exceeding 2 MPS were degraded S-band low frequency interference problem. |
| | | | 4:22 4:23 | | Bottom: STS0 | 56-90-034 | freeflying | SPARTAN-2 | 2 | CMIX STL | exceeding 2 MPS were degraded. - S-hand low frequency interference problem |
| | 1200 | | PTM (U/S 280): | WINDS: H6, 1L | | | a and a second | CHESION OF A TO | | IPARE | - TAGS jam TIPS on first flight worked OK on S-band, bad on Ku-band |
| - | | | 5:09 5:12 | OFFICIAL: H6, 1L | | | | | | SAREX-II HERCULES | - TIPS on first flight worked OK on S-band, bad on Ku-band |
| | N. Carlotte | | | - | | 1 | 0 | The last | | RME-III | (TAGS master switch was turned off) L5D injector temps high indicated htr failed on. |
| | K | - 90 | MECO CMD: 8:28.8 8:35 | DENS ALT: -74 FT | 2 | No. | 2 | | | RME-III AMOS CREAM | |
| | No. of the last | | 0.33 | FLT DURATION: | 430 | Acres 1 | AL STATE | | | ⁻ | RNDZ: Rendezvous #13 with SPARTAN for retrieval and return. |
| | | | <u>VI</u> : 25829 25825 | FLT DURATION: 9:06:08:19 222:08:19 | 1 | | | | | 4 CRYO TK SETS | |
| Crew inf | light portra | it: In front are CDR | | <u>S/T</u> : 355:23:47:29 | 16. | | | | | RMS 30 (S.N. 301) USED FOR | EVENTS: - SAREX contact with Russian Space Station, MIR, at |
| Camero | n (left) and | Foal/MS1. In back | <u>OMS-2</u> : 37:08 37:07 | | | 101 | | | | ISPARTAN DEPLOY | 2·17·55 MFT |
| are (left | to right) O | choa/MS3, PLT | 37:08 37:07 252 FPS 254 FPS | <u>OV-103</u> : 99:16:51:09 | | A COLOR | | | | CAPTURE & BERTH | - SPARTAN was deployed at 3:00:42 MET on orbit 49, |
| | and Cockr | | 202113 204113 | DISTANCE: | | | STORY | | | | grapple was at 05:01:51 MET, and berthed at 05:02:32 MET. |
| | | | | <u>DISTANCE</u> : 3,853,997 sm | | THE RESERVE | 100 | 2 | | | ··· - ·· |

| STS-55 OV-102 CDR: Sieven R. Nagel (Filght 14) Columbia Filght Filght Columbia Filght Columbia Filght Columbia Filght Filght Filght Columbia Filght Fil | | . T . I | VIAI | | ONS | MISSI | | ACE SHU | 3P <i>F</i> | | | |
|--|--|---|------|---|--|---|---|--|--|--|---|---|
| NO. TITLE, NAMES & EVA'S LANDING SITES, ABORT TIMES SECOND POPTILE ET AND INC HA/HP PAYLOADS EXPERIMENT | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, | | FCW/ | | | | NOM-ABORT | RUNWAY, | | | ODDITED | ELT. |
| STS-55 | TAL WEATHER, ASCENT I-LOADS, | | FSW | | INC | AND | THROTTLE PROFILE | LANDING TIMES FLT DURATION, | LANDING SITES, | | URDITER | |
| P/S 2: Hans W. Schlegel (Germany) P304/R164/M144 P304/R164/M144 P304/R164/M144 P304/R164/M144 P304/R164/M144 P304/R164/M144 P4/S 2:30 2:31 DRAG CHUTE JETTISON: 54 KGS JETTISON: 54 | KSC W/D: OPF 77, VAB 5, PAD 73 = 155 days LAUNCH POSTPONEMENTS: - 2/25/93 launch date was postponed to 3/21/93 because of SSME HPOT tip seal retainer pro-blem, SSME 3 LH ₂ umbilical hydraulic supply flex hose break and range conflicts with Delta and Atlas launches. LAUNCH SCRUBS AND PAD ABORT #3: - 3/21/93 launch date was scrubbed on 3/18/93 shortly after countdown started because of Delta launch scrub due to high winds 3/22/93 launch was scrubbed with a pad abort at T-3 seconds when SSME 3 (S.N. 2011) oxidizer preburner shutdown purge pressure exceeded 50 psi limit. Oxidizer preburner ASI purge checkvalve (N9) failed to close due to contamination. Decision was made to replace all three SSME's and moved STS-56 ahead of STS-55 (PAD abort #3) Replaced all 3 engines at pad 4/24/93 launch scrubbed after tanking at L-6.5 hours due to an IMU-2 failed BITE test. LAUNCH DELAYS: None. DOLILU/I-LOADS: - Both nominal and DOLILU were go. DOLILU selected because of increased Q-plane margin at Mach 1.55. DOLILU uplink #7, total I-load uplink #14. ELIGHT DURATION CHANGES: - Extended 1 day for additional science Extended 1 day for additional science Extended 1 day for additional science Extended one rev because of forecast variable broken ceiling and changed landing site to EDW concrete. LANDING SITE CHANGE: KSC to EDW. FIRSTS: First flight of operational TIPS. DRAG CHUTE: - Baseline chute used with strategy to deploy at derotation similar to STS-56. SIGNIFICANT ANOMALIES: - RSRM 6 PSI pressure spike at 69 seconds MET LSRM 10-12 PSI pressure spike at 69 seconds MET. | 33416 LBS PAYLOAD CHARGEABLE: 26881 LBS DEPLOYED: 0 LBS NON-DEPLOYED: 24599 LBS MIDDECK: 2282 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 737101 LBS NON-DEPLOYED: 696223 LBS CARGO TOTAL: 1641733 LBS PERFORMANCE MARGINS (LBS): FPR: 3934 FUEL BIAS: 1055 FINAL TDDP: 6248 RECON: 7559 PAYLOADS: PLB: SPACELAB SL-D2/LM (Germany) + USS + GAS GAS MIDDECK: SAREX-II 5 CRYO TK SETS NO RMS | (9) | INSERTION POST OMS-2 162 X 160 NM TRIM BURN #1: 0:10:33:00 MET 160.9 X 160.7 NM TRIM BURN #1: 2:21:34:30 MET 162 X 158 NM DEORBIT 163 X 153 NM VELOCITY 25779 FPS ENTRY RANGE 4299 NM 5-06 Inflight the 2 science T Henricks, Germany) & t) Harris/MS3 | (32) 1993-0: Deutscoort) PLT/PS1 (0:rr (lt to r | RSRM 30W ET-56 LWT-49 ET RPT ET BR/UP ET IMPACT LAT: 12.75°N LONG: 163.68°W 203-009 rait in SL-Front (It to lef, Walter MS2. Rea | 104/104/ 109% PREDICTED: 100/100/ 100/70/104 ACTUAL: 100/100/ 100/72/104 1 = 2031 (8) 2 = 2109 (10) 3 = 2029 (7) 2109 was rebuilt M 3 EOM WEIGHT: 227484 LBS X CG: 1078.4 LANDING WEIGHT: 227209 LBS X CG: 1079.7 | EDW 22 CONC (EDW 38, CONC 19) 126:14:29:59Z 7:29:59 AM PDT Thursday 6 5/6/93 (5) DEORBIT BURN: 126:13:29:20Z XRANGE: 640 NM ORBIT DIR: DL 28 AIM PT: CLOSE IN MLGTD: 1819 FT 126:14:29:59Z VEL: 210 KGS 217 KEAS HDOT: -1.5 FPS TD NORM 205: 2589 FT DRAG CHUTE DEPLOY: 165 KEAS 126:14:30:15Z NLGTD: 7283 FT 126:30:17Z VEL: 149 KGS HDOT: -4.6 FPS BRK INIT: 131 KGS DRAG CHUTE JETITSON: 54 KGS 126:30:41Z AVE BRK DECEL: 4.8 FPS/S WHEELS STOP: 126:14:31:00Z 11944 FT ROLLOUT: 10125 FT 61 SECS WINDS: HT3. L5 OFFICIAL: H15, L12 DENS ALT: 3166 FT FLT DURATION: 9:23:39:59 S/T: 365:23:27:28 OV-102: 108:17:20:40 | 116:14:49:59.98Z 10:50:00 AM EDT (P) 10:50:00 AM EDT (A) Monday 8 4/26/93 (10) LAUNCH WINDOW 2H30M - CTOB EOM PLS: KSC TAL: BYD TAL ALT: BEN, MRN SELECTED: RTLS: KSC 15/N/N TAL: BYD 32/N/SF AOA: EDW 22/CI/N PLS: EDW 22/CI/N PLS: EDW 22/CI/N PLS: EDW 22/CI/N PLS: EDW 22/CI/N 20:16 0.322/0.36 MAX O NAV: 714 PSF 715 PSF SRB STG: 2:04.6 2:06 PERF: NOMINAL 2 ENG TAL (BYD): 2:30 2:31 NEG RETURN: 3:58 4:03 PTA (U/S 235): 4:52 4:56 PTM (U/S 235): 5:28 5:33 MECO CMD: 8:28.18 8:30.9 VI: 25877 25870 | Steven R. Nagel (Fit 4 - STS 51-G, STS 61-A, & STS-37) P298/R64/V23/M59 PLT: Terence T. Henricks (Fit 2 - STS-44) P299/R135/V93/M120 M/S 1 (PYLD CDR): Jerry L. Ross (Fit 4 - STS 61-B, STS-27, & STS-37) P300/R86/V38/M78 M/S 2: Charles J. Precourt P301/R161/M141 M/S 3: Bernard A. Harris, Jr. P302/R162/M142 P/S 1: Ulrich Walter (Germany) P303/R163/M143 P/S 2: Hans W. Schlegel (Germany) P304/R164/M144 MCC FCR-1 (34) FLIGHT DIRECTORS: A/E/O1 - N. W. Hale Ld/O 2 - G. E. Coen O 3 - J. M. Heflin | (Flight 14) Columbia Twelfth Spacelab Flight Long Module (8) OMS PODS LP05-3 RP05-3 RR05-3 FRC2-14 | SEQ FLT #55 KSC-55 PAD 39A-36 MLP-3 STS055-11 German paspecialists and Schleg |

| CREW | | LANDING CITE/ COME TI | | | | | | | | | | | | |
|--|-------------|-----------------------|----------------------------|--------------------|------------------------|---------------|--|------------|----------------|-----|---------------------|--|--|--|
| TITLE NAMES | FLT | ODDITED | | | RUNWAY, | NOM-ABORT | | | ORBIT | FOW | | | | |
| ## CONTROL OF CONTROL | | OKBITER | ` ' | | | | | | | FSW | | | | |
| SEC PL 165 1 | NO. | | TITLE NAMES | | | | | INC | HA/HP | | | | | |
| SCORD Color Colo | | | | ABORT TIMES | | | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) | | |
| Record Life Content | | | | | WINDS | | | | | | | | | |
| Second 172-130-721-95 172-130-721- | STS-57 | | | KSC 39B | KSC 33 (KSC 16) | | BI-059 | 28.45° | | | | KSC W/D: OPF 52, VAB 16, PAD 51 = 119 days total. | | |
| SSC 66 Spacehab PURP P | | | Ronald J. Grabe | 172:13:07:21.95Z | 182:12:52:16Z | 109% | | (33) | INSERTION | (1) | 29119 LBS | | | |
| Page | SEQ FLT #56 | Endeavour | | 9:07:00 AM EDT (P) | 8:52:16 AM EDT | | | | | | | | | |
| Mile 2 Part | | | S1S-30 & S1S-42) | 9:07:22 AM EDT (A) | T 7 | PREDICTED: | 32 KM | | POST OMS-2: | | PAYLOAD | - Launch date was 5/10/93 then postponed to 5/18/93. | | |
| ## PAD MR PODS PET Burn Duffy First | KSC-56 | Spacenab 1 | P305/R76/V41/M70 | Monday 9 | | | FT 50 | | 252 X 212 NM | | | - Launch date was postponed from 5/18/93 to 6/3/93 because | | |
| PG3-15 | | OMC DODC | DI T | 6/21/93 (6) | // 1/93 (6) | 67/104 | E1-58 | | NC2 DUDN. | | 19630 LBS | 0f 515-55 and 515-56 launch delays. | | |
| RPQ4-11 RC 5-4 RD 26-14 RQ 24-14 R | | UNS PUDS LDO2 15 | | I VIINCH WINDOW | DEODDIT DUDNI: | ACTUAL: | LWT | | FA EDS | | DEDI OVED: | SSME 2 LIDOTD required changeout (OA electrochemical etch | | |
| FRCS 4 P306/F142/W4M126 P145KE WINDOW | 370 20 | | (FIt 2 STS 45) | 71M/QS DI ANIAD/ | 102·11·11·127 | 100/100/100/ | 51 | | 30113 | | 122 I BS | marking found in a high stress area of HDOTD turking hearing | | |
| MS_IPAYLOAD_CRN: CRN: Line | | | P306/R142/V94/M126 | | 102.11.41.422 | | 31 | | 257/251 NM | | 132 LD3 | | | |
| G. David Low TAL. SPG Confined | | 11100 1 | 1 000/101 12/ 0 7 1/101120 | TIMOL WINDOW | XRANGE: 587 NM | 72/101 | ET | | 2077201 14141 | | NON-DEPLOYED: | protodd spring). | | |
| G. David Low TAL. SPG Confined | | | M/S 1 (PAYLOAD CDR): | EOM PLS: KSC | | 1 = 2019 (12) | RPT | | TI BURN: | | 18244 LBS | LAUNCH SCRUBS: | | |
| P307R110W4M99 MS_2 | | | G. David Low | TAL: BYD | ORBIT DIR: DL 29 | 2 = 2034 (2) | | | 258 X 255 NM | | | - 6/20/93 launch was scrubbed during hold at T-5 minutes when | | |
| MS_2 | | | (Flt 3 - STS-32 & STS-43) | TAL WX: BEN, MRN | | 3 = 2017 (8) | <u>ET</u> | | | | MIDDECK: | 71 minute 48 second launch window expired. All three TAL sites | | |
| Nancy J. Sherbock PageRiteSF27 AQA EDW22/CIN PLS EDW22/CI | | | P307/R110/V64/M98 | OF! FOTED | AIM PT: CLOSE IN | = 0 | BR/UP | | | | 1254 LBS | were NO-GO (Banjul for thunderstorms and Ben Guerir and | | |
| Nancy J. Sherbock PageRiteSF27 AQA EDW22/CIN PLS EDW22/CI | | | M/C 2 | SELECTED: | MLCTD, 2207 FT | M 3 EOM: | | | | | CHUTTLE | Moron for crosswind exceedences.) | | |
| P308/R165F21 | | | | RILS: KSC 15/CI/N | NLG I D: 2290 F I | WEIGHT: | LIMDACT | | 256 X 209 NIVI | | SHUTTLE ATED | LAUNCH DELAVO | | |
| MS 3 | | | | ΔΩ. FDW22/CI/N | VEL: 202 KGS | | I ΔT· | | DEORRIT: | | WEIGHTS: | Launch delayed 22 seconds because of an intruder aircraft | | |
| HOUT: -1 of PS Poler J. K. (Jeff) Wisoff Poler J. | | | 1 300/10/103/1 21 | | | | | | 256 X 208 NM | | | | | |
| Peter J. K. (Leff) Wisoff Power | | | M/S 3: | | | 1001.1 | LONG: | | | | | when the aircraft entered KSC airspace (Launch danger area). | | |
| P309/R166M145 | | | Peter J. K. (Jeff) Wisoff | TDEL: | | LANDING: | 142.90°W | | VELOCITY: | | NON-DEPLOYED: | · | | |
| MS_4: Alanice E. Voss Pa10R16/F22 BRS TG: 182:125:225 | | | P309/R166/M145 | 0.00 0.722/0.76 | | | | | 25988 FPS | | 715721 LBS | | | |
| Janice E. Voss P310R16/T622 EMUTETHERED EVA: EV 1: G David Low EV 2: Jeff Wisoff EVA 1 - 6/25/93 5:50 Duration EV 3: Jef Wisoff EVA 1 - 6/25/93 5:50 Duration EV 3: Jef Wisoff EVA 1 - 6/25/93 5:50 Duration EV 3: Jef Wisoff EVA 1 - 6/25/93 5:50 Duration EV 3: Jeff Wisoff EVA 1 - 6/25/93 5:50 Duration EV 3: Jeff Wisoff EVA 1 - 6/25/93 5:50 Duration EV 3: Jeff Wisoff EVA 1 - 6/25/93 5:50 Duration EV 3: Jeff Wisoff EVA 1 - 6/25/93 5:50 Duration EV 3: Jeff Wisoff EVA 1 - 6/25/93 5:50 Duration EV 3: Jeff Wisoff EVA 1 - 6/25/93 5:50 Duration EV 3: Jeff Wisoff EVA 1 - 6/25/93 5:50 Duration EV 3: Jeff Wisoff EVA 1 - 6/25/93 5:50 Duration EV 3: Jeff Wisoff EVA 1 - 6/25/93 5:50 Duration EV 3: Jeff Wisoff EVA 1 - 6/25/93 5:50 Duration EV 3: Jeff Wisoff EVA 1 - 6/25/93 5:50 Duration EV 3: Jeff Wisoff EV 3: Jeff Wisoff EVA 1 - 6/25/93 5:50 Duration EV 3: Jeff Wisoff EVA 1 - 6/25/93 5:50 Duration EV 3: Jeff Wisoff E | | | 14/0.4 | MANY O NIANY | 2461 FT | | | | ENTEN | | CARGO TOTAL: | - Banjul was forecast and observed NO GO for ceiling and rain. | | |
| P310/R167/F22 SRB STG: 2.04 2.06 V. T. F. K. EAS 182.172.523.42 V. E. T. SAG V. T. G. David Low EV 2: Jeff Wisoff PERF: NOMINAL EVA 1 - 6/25/93 2.17 V. E. T. SAG V. T. S. T. S. T. SAG V. T. S. T | | | | MAX Q NAV: | DDAC CHUTE | | | | | | 16/0852 LBS | Ben Guerir (selected) was forecast and observed GO. Moron | | |
| SRB STG: 2.06 EV 1: G. David Low EV 2: Jeff Wisoff PERF: NOMINAL EV: 1.35 KGS HoDT: 3.4 FPS FR. 3934 FUEL BIAS: 1055 FOR 3934 FUEL BIAS: 1055 FUEL BIAS: 1055 FOR 3934 FUEL BIAS: 1055 FUEL BIAS: 1055 FOR 3934 FUEL BIAS: 1055 F | | | | 090 P3F 122 P3F | | 1002.3 | | | | | DEDEODMANCE | observed GO | | |
| EMUTETHERED EVA; 2.04 2.06 EV 2: Jeff Wisoff EV 2: Jeff Wisoff EV 2: Jeff Wisoff EV 3: A FPS 5:50 Duration EV 4: Jeff Wisoff EV 4: Jeff Wisoff EV 5: A Jeff Wisoff EV 5: Jeff Wisoff EV 5: Jeff Wisoff EV 4: Jeff Wisoff EV 5: Jeff Wisoff EV 5: Jeff Wisoff EV 5: Jeff Wisoff EV 6: Jeff Wisoff EV 7: Jef | | | 1 310/10//1 22 | SRB STG: | 182:12:52:257 | | | | 42 10 INIVI | | MARGINS (LBS): | observed Go. | | |
| EV 2: Jeff Wisoff EVA 1 - 6/25/93 5:50 Duration EV 2: Jeff Wisoff EVA 1 - 6/25/93 5:50 Duration EV 2: Jeff Wisoff EVA 1 - 6/25/93 5:50 Duration EV 3: Jens Tal. (BEN): 3:45 4:07 PTA (UIS 395): 4:10 4:12 PTA (UIS 427): 5:32 5:31 MEC O CMD: 8:32:47 8:33 MEC Continued EV 2: Jeff Wisoff EVA 1 - 6/25/93 5:50 Duration EV 2: Jeff Wisoff EVA 1 - 6/25/93 5:50 Duration EV 2: Jeff Wisoff EVA 1 - 6/25/93 5:50 Duration EV 2: Jeff Wisoff EVA 1 - 6/25/93 5:50 Duration EV 2: Jeff Wisoff EVA 1 - 6/25/93 5:50 Duration EV 2: Jeff Wisoff EVA 1 - 6/25/93 SRCON: 2162 PAYLOADS: PLIGHT DURATION CHANGES: 3 days extension - Extended 1 day because of forecast thunderstorms on rev stance on reves and power lays and 140. PELICHT DURATION CHANGES: 3 days extension - Extended 1 day because of forecast thunderstorms on revs stance on reves and power lays and 140. PLICHT DURATION CHANGES: 3 days extension - Extended 1 day because of forecast thunderstorms on revs stance on reves and power lays and 140. PLICHT DURATION CHANGES: 3 days extension - Extended 1 day because of forecast thunderstorms on rev stance on reves and power lays and 140. PLICHT DURATION CHANGES: 3 days extension - Extended 1 day because of forecast thunderstorms on rev stance on reves and power lays and 140. PLICHT DURATION CHANGES: 3 days extension - Extended 1 day because of forecast thunderstorms on rev stance and power lays and stance and power lays and 140. PLICHT DURATION CHANGES: 3 days extension - Extended 1 day because of forecast thunderstorms on rev stance and power lays and stance and power lays and stance an | | | EMU/TETHERED EVA: | 2:04 2:06 | 1021121021202 | | | | | | FPR: 3934 | DOLILU/I-LOADS: | | |
| VEL: 135 KGS HDOT: -3.4 FPS Sto Duration 2 ENG TAL (BEN): 2:33 2:37 NEG RETURN: 3:45 4:07 PTA (U/S 395): 4:10 PTM (U/S 427): 5:32 5:31 MECO CMD: 8:32.47 8:33 NEFS 26025 ROLLOUT: 26028 26025 ROLLOUT: 26028 26025 ROLLOUT: 26028 Continued Continued EVEI: 135 KGS HDOT: -3.4 FPS WHELS STOP: 182:12:52:571 WHELS STOP: 182:12:52:572 AVE BRK DECEL: 4.4 FPS/S AREX-II AVE BRC ONCAP-IV BRETURN BOOT, GBA, CONCAP-IV BRETURN BROOT, GBA, CONCAP-IV BRETURN BOOT, GBA, CONCAP-IV BRESSTOP: 183:1610 ft of tags chue wilhout ribbons removed. (Was second flight will 90 percent removed. (Was | | | | | <u>NLGTD</u> : 7498 FT | | | | | | FUEL BIAS: 1055 | - Nominal I-loads were GO and selected because of better | | |
| EVA 1 - 6/25/93 5:50 Duration PAYLOADS: PAYLOADS: PAYLOADS: PAYLOADS: PAYLOADS: PAYLOADS: PAYLOADS: PAYLOADS: PROCEEDINGS PROCESS 2000 PAYLOADS: PAYLOADS: PROCESS 2000 PAYLOADS: PAYLOADS: PROCESS 2000 PAYLOADS: PROCESS 2000 PAYLOADS: PROCESS 2000 PAYLOADS: PAYLOADS: PROCESS 2000 PAYLOADS: PROCESS 2000 PAYLOADS: PAYL | | | EV 2: Jeff Wisoff | PERF: NOMINAL | 182:12:52:34Z | | | BUS V . IN | | | FINAL TDDP: 2030 | Q-plane than DOLILU. No uplink required. | | |
| BRK INIT: 101 KGS NEG RETURN: 3:45 4:07 PTA (U/S 395): 4:10 4:12 PTM (U/S 427): 5:32 5:31 MECO CMD: 8:32.47 8:33 MECO CMD: 8:40 First flight of TaGs, next to last flight of teleprinter. 9: First flight of TaGs, next to last fligh | | | EVA 1 (/2E/02 | 2 ENC TAL (DENI). | | | | 4 4 | | źi. | RECON: 2162 | FLICHT DUDATION CHANCES, 2 days outopoion | | |
| BRK INIT: 101 KGS NEG RETURN: 3:45 4:07 PTA (U/S 395): 4:10 4:12 PTM (U/S 427): 5:32 5:31 MECO CMD: 8:32.47 8:33 MECO CMD: 8:40 First flight of TaGs, next to last flight of teleprinter. 9: First flight of TaGs, next to last fligh | | | | 2 ENG TAL (DEIV). | ПРО13.4 ГЬЗ | - | | 5 | | 1 | DAVI OADS: | Extended 1 day for additional science | | |
| NEG RETURN: 3:45 4:07 PTA (U/S 395): 4:10 4:10 MECO CMD: 8:32-47 8:33 MECO CMD: 26028 26025 Continued Continued DRAG CHUTE JETTISON: 56 KGS 4:10 4:10 MECO CMD: 18:12:52:57Z MHEELS STOP: 18:212:53:21Z 12251 FT VI: 26028 26025 Continued Continued STS057-94-017 1993-07-01 Front row left to right: Wisoff/MS3, PLT Duffy, Voss/MS4. In rear (left to right): CDR Grabe, Sherlock/MS2 and Continued SPACEHAB-1 EURECA CAPTURE AND RETURN SHOOT, GBA, CONCAP-IV MIDDECK: FARE AND RETURN SHOOT, GBA, CONCAP-IV MIDDECK: FARE AND SAREX-II Convective development and potential thundersforms on rev 125. Extended 1 day because of forecast thunderstorms on rev 139 and 140. FIRSTS/LASTS: - Last flight of the improved APU controller (APU #2) Last flight of the improved APU controller (APU #2) Last flight of the improved aPU controller (APU #2) Last flight of the improved aPU controller (APU #2) Last flight of the improved APU controller (APU #2) Last flight of the imp | | | 5.50 Daration | 2.55 | BRK INIT: 101 KGS | | | | = 0 P K | | PI R. | - Extended 1 day herause of forecast low ceiling on rev 124 and | | |
| 3:45 4:07 PTA (U/S 395): 4:10 4:12 PTM (U/S 427): 5:32 5:31 MECO CMD: 8:32.47 8:33 WHEELS STOP: 182:12:52:5217 VI: 26028 26025 MOMS-2: 42:11.7 42:13 318 FPS 316 FPS Continued Continued Continued DRAG CHUTE JETIISON: 56 KGS 182:12:52:57Z AVE BRK DECEL: 4.4 FPS/S WHEELS STOP: 182:12:52:21Z 12251 FT STS057-94-017 1993-07-01 Front row left to right: Wisoff/MS3, PLT Duffy, Voss/MS4. In rear (left to right): CDR Grabe, Sherlock/MS2 and Law/MS4/FILE Continued DRAG CHUTE JETIISON: 56 KGS 182:12:52:57Z AVE BRK DECEL: 4.4 FPS/S WHEELS STOP: 182:12:52:521Z 12251 FT AVE BRK DECEL: 4.4 FPS/S WHEELS STOP: 182:12:52:521Z 12251 FT STS057-94-017 1993-07-01 Front row left to right: Wisoff/MS3, PLT Duffy, Voss/MS4. In rear (left to right): CDR Grabe, Sherlock/MS2 and Law/MS4/FILE Continued Continued EURECA CAPTUR AND RETURN SHOOT, GBA, CONCAP-IV FIRSTS/LASTS: - Last flight of the improved APU controller (APU #2) | | | | NEG RETURN: | DICK HAIT. TO TROS | | | · VEST | | | SPACFHAB-1 | convective development and potential thunderstorms on rev | | |
| PTA (U/S 395): 4:10 4:10 4:10 4:10 4:10 4:10 4:10 4:10 | | | | 3:45 4:07 | | | The state of the s | | - 1 | | EURECA CAPTURE | 125. | | |
| ### Action ### A | | | | | | | | 08/4 | = | 40 | | - Extended 1 day because of forecast thunderstorms on revs | | |
| PTM (U/S 427): 5:31 PTM (U/S 427): 5:32 AVE BRK DECEL: 4.4 FPS/S WHEELS STOP: 18:21:25:3:217 12251 FT PTM (U/S 427): 5:32 AVE BRK DECEL: 4.4 FPS/S WHEELS STOP: 18:21:25:3:217 12251 FT PTM (U/S 427): 5:32 AVE BRK DECEL: 4.4 FPS/S WHEELS STOP: 18:21:25:3:217 12251 FT PTM (U/S 427): 5:32 AVE BRK DECEL: 4.4 FPS/S WHEELS STOP: 18:21:25:3:217 12251 FT PTM (U/S 427): 5:32 AVE BRK DECEL: 4.4 FPS/S WHEELS STOP: 18:21:25:3:217 12251 FT AVE BRK DECEL: 4.4 FPS/S WHEELS STOP: 18:21:25:3:217 12251 FT AVE BRK DECEL: 4.4 FPS/S WHEELS STOP: 18:21:25:3:217 12251 FT AVE BRK DECEL: 4.4 FPS/S WHEELS STOP: 18:21:25:3:217 12251 FT AVE BRK DECEL: 4.4 FPS/S WHEELS STOP: 18:21:25:3:217 12251 FT AVE BRK DECEL: 4.4 FPS/S WHEELS STOP: 18:21:25:3:217 12251 FT AVE BRK DECEL: 4.4 FPS/S WHEELS STOP: 18:21:25:3:217 12251 FT AVE BRK DECEL: 4.4 FPS/S WHEELS STOP: 18:21:25:3:217 12251 FT AVE BRK DECEL: 4.4 FPS/S WHEELS STOP: 18:21:25:3:217 12251 FT AVE BRK DECEL: 4.4 FPS/S BRMS 31 (S.N. 303) RMS 31 (S.N. 303) RMS used to grapple and berth EURECA and berth EURECA and EVA DTO 1210. (EURECA deployed on STS-46) AVE BRK DECEL: 4.4 FPS/S Continued STS057-94-017 1993-07-01 Front row left to right; Wisoff/MS3, PLT Duffy, Voss/MS4. In rear (left to right): CDR and EVA DTO 1210. (EURECA deployed on STS-46) | | | | | | | 1 | | 200 | AR. | KETUKN | 139 and 140. | | |
| PTM (U/S 427): 5:31 AVE BRK DECEL: 4.4 FPS/S WHECO CMD: 8:32 .47 8:33 WHELS STOP: 182:12:53:217 12251 FT VI: 26028 26025 OMS-2: 42:11.7 42:13 318 FPS 316 FPS Continued AVE BRK DECEL: 4.4 FPS/S WHEELS STOP: 182:12:53:217 12251 FT STS057-94-017 1993-07-01 Front row left to right: Wisoff/MS3, PLT Duffy, Voss/MS4. In rear (left to right): CDR Grabe, Sherlock/MS2 and Continued AVE BRK DECEL: 4.4 FPS/S WHEELS STOP: 182:12:53:217 12251 FT STS057-94-017 1993-07-01 Front row left to right: Wisoff/MS3, PLT Duffy, Voss/MS4. In rear (left to right): CDR Grabe, Sherlock/MS2 and Continued Continued AVE BRK DECEL: 4.4 FPS/S WHEELS STOP: 182:12:53:217 12251 FT ACRYO TK SETS - Last flight of TAGS, next to last flight of the improved APU controller (APU #2) Last flight of the improved APU controller (APU #2) Last flight of the improved APU controller (APU #2) Last flight of the improved APU controller (APU #2) Last flight of TAGS, next to last flight of TAGS, next to last flight of the improved APU controller (APU #2) Last flight of TAGS, next to last flight of TAGS, next to last flight of TAGS, next to last flight of the improved APU controller (APU #2) Last flight of trace in the improved APU controller (APU #2) Last flight of trace in the improved APU controller (APU #2) Last flight of TAGS, next to last flight of TAGS, next to last flight of the improved APU controller (APU #2) Last flight of TAGS, next to last flight of | 3 | 1 | [4] | 4:10 4:12 | 102:12:52:572 | 100 | 100 | 200 | | | | FIRSTS/I ASTS: | | |
| MECO CMD: 8:32.47 8:33 WHEELS STOP: 182:12:53:217 12251 FT VI: 26028 26025 OMS-2: 42:11.7 42:13 318 FPS 316 FPS Continued | 100 | 1 FF :- | , 80 | PTM (II/S 427): | AVE BRK DECEL: | | | 1 | A de | | CONCAL 1V | - Last flight of TAGS next to last flight of teleprinter | | |
| MECO CMD: 8:32.47 8:33 WHEELS STOP: 182:12:53:217 12251 FT VI: 26028 26025 OMS-2: 42:11.7 42:13 318 FPS 316 FPS Continued | H | | - 11 | 5:32 5:31 | 4.4 FPS/S | 1595 | | | | | MIDDECK: | - First flight of the improved APU controller (APU #2). | | |
| MECO CMD: 18:32.47 8:33 WHEELS STOP: 182:12:53:217 12251 FT VI: 26028 26025 OMS-2: 42:11.7 42:13 318 FPS 316 FPS Continued | S | | <u>≨</u> | 3.01 | | | | | (Appendix | | FARE | I- Last flight of drag chute without ribbons removed. (Was | | |
| 8:32.47 8:33 182:12:53:217 12251 FT 12251 FT 26028 26025 Continued STS057-94-017 1993-07-01 Front row left to right: Wisoff/MS3, PLT Duffy, Voss/MS4. In rear (left to right): CDR Grabe, Sherlock/MS2 and Continued STS057-94-017 1993-07-01 Front row left to right: Wisoff/MS3, PLT Duffy, Voss/MS4. In rear (left to right): CDR Grabe, Sherlock/MS2 and Continued SAREX-II 4 CRYO TK SETS Started EVA at 3:23:59:51 MET (planned 4 hours). David Low pushed on EURECA antenna and ESOC commanded latches. David had to move antennas in "z" to get them latched. Both antennas confirmed latched at EVA time of 2:25, when they started the scheduled EVA DTO 1210. (EURECA deployed on STS-46) | 6 | 100 | 19 | MECO CMD: | WHEELS STOP: | | 119 | | | | AMOS | second flight with 90 percent reefed). | | |
| VI: 26028 26025 OMS-2: 42:11.7 42:13 318 FPS 316 FPS Continued | 100 | | 8 / | 8:32.47 8:33 | | | 1 | | | | SAREX-II | EVENTO. | | |
| Continued | | A A | | VII. | 12251 FT | | | | | | A CDVO TV SETS | EVENTO: Storted EVA at 2:22:E0:E1 MET (planned 4 hours). David Law | | |
| Continued | ORA | BE DUFF | | | DOLLOUT: | STS057- | 94-017 | 1993-0 | 7-01 Front | row | 4 CKIU IK SEIS | pushed on ELIDECA antenna and ESOC commanded latches | | |
| 42:11.7 42:13 VOSS/MS4. In Teal (left to fight). CDR RMS used to grapple started the scheduled EVA DTO 1210. (EURECA deployed on and berth EURECA and EVA DTO | | | | 20020 20023 | | | | | | | RMS 31 | David had to move antennas in "7" to get them latched Roth | | |
| 42:11.7 42:13 VOSS/MS4. In Teal (left to fight). CDR RMS used to grapple started the scheduled EVA DTO 1210. (EURECA deployed on and berth EURECA and EVA DTO | | | | OMS-2: | | | | | | | (S.N. 303) | antennas confirmed latched at EVA time of 2:25, when they | | |
| Continued | | | | 42:11.7 42:13 | | | | | |)R | RMS used to grapple | started the scheduled EVA DTO 1210. (EURECA deployed on | | |
| and EVA DIO | | | Continued | 318 FPS 316 FPS | Continued | Grabe, S | herlock/ | MS2 a | nd | | and berth EURECA | STS-46 | | |
| Continued | | | | | | | | | | | and EVA DTO | Constinued | | |
| | | | | | | 2007/1010 | .,, LO . | | | | | Continuea | | |

| FLT | ORBITER | CREW (6) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|--------|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-57 | | Continued | | Continued | | Continued | | | | | |

Continued

SPACE SHUTTLE EVA #21 SCHEDULED EVA #17 REFINE EVA TRAINING CONCEPTS AND DEMON-STRATE EVA TECHNIQUES FOR FUTURE EVA'S. ADDED UNSCHEDULED

MANUAL LATCHING OF **EURECA ANTENNAS**

MCC FCR-1 (35)

FLIGHT DIRECTORS: A/E - J. W. Bantle LD/O 1 - G. A. Pennington O 2 - P. L. Engelauf PLNG - R. M. Kelso MOD - G. E. Coen

<u>WINDS:</u> H6, L2 KTS OFFICIAL: H10, L2

DENS ALT:

FLT DURATION:

S/T: 375:23:12:22

<u>OV-105</u>: 32:19:11:12

DISTANCE: 4,118,037 sm

1571 FT

9:23:44:54 239:44:54

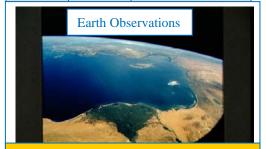
Above: STS057-97-056 1993-07-01 -- Low and Wisoff

perform DTO 1210 EVA in OV-105's payload bay .

RENDEZVOUS #14:
- Rendezvous with EURECA for capture, retrieval, and return.

- SIGNIFICANT ANOMALIES:
 O₂ manifold valve tank 1 failed to close.
- Fuel cell 3 H₂ reactant valve failed to close.
- PPO2 sensor B is biased low.
- MCA logic MCA power AC3 3-phase mid 4 CB anomaly. AC3 phase-to-phase short/Spacehab PDU fuses blown and replaced (command error).

 - Mid starboard and aft port floodlights failure.
- EVA waist tether small tether hook failure.
- Leaking EMU 1200-series battery.
 RMS grapple fixture/EURECA thermal control unit switch problem (installed reversed).
- Jet R5D heater failed on.
- EURECA antennas failed to latch (crew manually latched them during planned EVA).
- S-band intermittent forward and return links on lower left quad antenna.
- Ammonia boilers failed to cool post landing.



ABOVE: STS057-80-09 --- Agriculural development in Rio Bermejo, Argentina. BELOW: STS057-73-075 --- Eastern Mediterranean, Nile River, Asia Minor looking north over the Nile.





STS057-93-052 1993-07-01 EURECA is retrieved by RMS to be stowed in PLB for return to earth.



sts057-s-089 -- Post mission in the MCC are Greg Smith/FAO (Flight Activities Officer), holding mission plaque, and CAPCOM Curt Brown (right).

| SPACE SHUTTLE MISSIONS SUMMARY Page 2-68 - STS-51 | | | | | | | | | | | | |
|---|--|--|--|---|------------------------------|---------------------|----------|---------------------------------|-------|---------------------------------|---|--|
| | | CREW | LAUNCH SITE, | LANDING SITE/ RUNWAY, | SSME-TL NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS | |
| FLT | ORBITER | (5) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | ORBIT | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, | |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, | |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) | |
| STS-51 | OV-103 | CDR: | KSC 39B | WINDS KSC 15 (KSC 17) | ENG. S.N. 104/104/ | BI-060 | 28.45° | DIRECT | OI-22 | CARGO: | KSC W/D: OPF 57, VAB 8, PAD 69 = 134 days total. | |
| | (Flight 17) | Frank L. Culbertson | 255-11-44-59 977 | 265:07:56:06Z | 109% | | (34) | INSERTION | (2) | 46685 LBS | · | |
| SEQ FLT #57 | Discovery | (Flt 2 - STS-38) P311/R116/V95/M104 | 7:45:00 AM EDT (P) 7:45:00 AM EDT (A) | 3:56:06 AM EDT | PREDICTED: | RSRM 33 | | POST OMS-2: | | PAYLOAD | - Launch date was 2/22/93 as of 6/28/91 but was postponed to | |
| KSC-57 | OMS PODS | | Sunday 7 | Wednesday 6 | 100/104/104/ | | | 161.1 X 160.3 | | CHARGEABLE: | 6/30/93 on //32/92 to reflect changes in manifest. - 6/30/93 launch was postponed to 7/13/93 on 3/31/93 based on | |
| DAD | LPO1-20 RPO3-18 | PLT: William F. Readdy | 9/12/93 (4) | 9/22/93 (6) | 67/104 | ET-59 | | NM | | 42637 LBS | STS-55, STS-56, and STS-57 launch delays. | |
| PAD 39B-21 | FRC3-17 | (Flt 2 - STS-42) | LAUNCH WINDOW: | DEORBIT BURN: 265:06:55:30Z | ACTUAL: | LWT | | ACTS/TOS | | DEPLOYED: | launch delays. (See 7/17/93 and 7/24/93 scrubs below.) | |
| MLP-3 | | P312/R140/V96/M125 | 1H55M ACTS/TOS RAAN ORBIT 23A | | 100/104/104/ 69/104 | 52 | | DEPLOY: 0/7:58:09 | | 26889 LBS | Meteoroid (Comet Swift-Tuttle) event on 8/11/93. Launch | |
| | | <u>M/S 1</u> : | EOM DI C. KCC | XRANGE: 89 NM | | <u>ET</u> RPT | | MET (P) 0/9:28:28 | | NON-DEPLOYED: 7305 LBS | rescheduled for 8/12/93. (See 8/12/93 scrub below.) - 9/10/93 launch postponed to 9/12/93 on 9/3/93 to allow | |
| | | James H. Newman P313/R168/M146 | EOM PLS: KSC TAL: BYD | ORBIT DIR: DL 30 | 1 = 2030 (9) 2 = 2033 (4) | <u>KPT</u> | | MET (A) | | 7300 LBS | ACTS/TOS to complete a review/analysis of transistor alert | |
| | | M/S 2: | TAL WX: BEN | AIM PT: CLOSE IN | 2 = 2033 (4) 3 = 2032 (2) | <u>ET</u> BR/UP | | 173.5`X´160.9 NM | | MIDDECK: 1122 LBS | LAUNCH POSTPONEMENTS: - Launch dale was 2/22/93 as of 6/28/91 but was postponed to 6/30/93 on 7/32/92 to reflect changes in manifest. - 6/30/93 launch was postponed to 7/13/93 on 3/31/93 based on STS-55, STS-56, and STS-57 launch delays. - 7/13/93 launch was postponed to 7/17/93 because of STS-57 launch delays. (See 7/17/93 and 7/24/93 scrubs below.) - 8/4/93 launch date was postponed on 7/30/93 to avoid Perseid Meteoroid (Comet Swift-Tuttle) event on 8/11/93. Launch rescheduled for 8/12/93. (See 8/12/93 scrub below.) - 9/10/93 launch postponed to 9/12/93 on 9/3/93 to allow ACTS/TOS to complete a review/analysis of transistor alert (suspected as potential cause of NOAA-I and MARS Observer failures). | |
| | | Daniel W. Bursch | SELECTED: | MLGTD: 2099 FT 265:07:56:06Z | | DR/UP | | | | 1122 LD3 | LAUNCH SCRUBS/PAD ABORT #4: | |
| | | P314/R169/M147 | RTLS: KSC15/CI/N TAL: BEN36/N/N | 265:07:56:06Z VEL: 198 KGS 194 KEAS | M 3 EOM: WEIGHT: | <u>et</u> Impact | | ORFEUS- SPAS | | SHUTTLE ACCUMULATED | LAUNCH SCRUBS/PAD ABORT #4: -7/17/93 launch was scrubbed at L-31 minutes. At approximately L-2 hours, nine "B" systems PIC's indicated they were charged (four on each SRB holddown post and one on ET vent arm); | |
| | | M/S 3: | AOA: EDW22/CI/N | HDOT: -1.0 FPS | 207043 LBS | LAT: | | DEPLOY: | | WEIGHTS: | were charged (four on each SRB holddown post and one on ET | |
| | | Carl E. Walz P315/R170/M148 | PLS: EDW22/CI/N | TD NORM 195: 2080 FT | X CG: 1084.8 | 12.89°N LONG: | | 1/03:21:00 MET 164.6 X 147.2 | | DEPLOYED: 764122 LBS | breakout caused by right SRB lilt HPU underspeed. - 8/12/93 launch was scrubbed at T-19 seconds with an RSLS breakout caused by right SRB lilt HPU underspeed. - 8/12/93 launch aborted at T-3 seconds when SSME #2 (S.N. 2033) fuel flow sensor A2 miscompared with sensor A1. (Pad | |
| RTSON | READ | 1 0 10/10/10/10/10 | TDEL: | | | 163.4°W | | NM | | NON-DEPLOYED: | - 8/12/93 Jaunch aborted at T-3 seconds when SSME #2 (S.N. | |
| J. B. | - O. | SPACE SHUTTLE EVA #22 | 0.16 0.322 | DRAG CHUTE DEPLOY: 165 KEAS | <u>Landing</u> : Weight: | | | ORFEUS-SPAS | | 724148 LBS CARGO TOTAL: | [abolt #4.] | |
| 2 / | III WIN | SPACE SHUTTLE EVA #22 SCHEDULED EVA #18 | MAX Q NAV: | 265:07:56:16Z | 206932 LBS | | | GRAPPLE: | | 1717537 LBS | Launch réset to 9/10/93. Replaced all 3 engines at pad. | |
| W | MAN | DTO 1210 EVA OPERATIONS/ | 700 PSF 707 PSF | <u>NLGTD</u> : 6539 FT 265:07:56:21Z VEL: 144 KGS | X CG: 1086.5 | | | 7/00:05 MET | | PERFORMANCE | TAL WX: Banjul (prime) was forecast and observed NO-GO - ceiling. Ben Guerir (selected)was forecast and observed GO. | |
| 4 | | PROCEDURES/TRAINING FOR FUTURE EVA'S | <u>SRB STG</u> : 2:04.6 2:05.0 | VEL: 144 KGS HDOT: -3.9 FPS | | 054.00 | 007 | DEORBIT: 166 X 141 NM | | MARGINS (LBS): | | |
| BU | RSCH | FUR FUTURE EVA S | | | Top: STS Newman | | 037 | | | FPR: 3934 FUEL BIAS: 1055 | DOLILU/I-LOADS: Both nominal and DOLILU I-loads were GO but DOLILU was selected and uplinked to provide a slight increase in performance and drainback time. DOLILU uplink #8, I-load uplink #15. | |
| | | <u>EMU/TETHERED EVA</u> : EV 1: Carl Walz | PERF: NOMINAL | BRK INIT: 113 KGS | evaluate | | HST | VELOCITY: 25794 FPS | | FINAL TDDP: 1358 RECON: 1273 | Increase in performance and drainback time. DOLILO uplink #8, I-load uplink #15. | |
| | | EV 2: Jim Newman | 2 ENG TAL (BEN): | DRAG CHUTE JETTISON: | servicing | mission. | 2) 4 = 0 | | | | FLIGHT DURATION CHANGES: - Waved off rev 142 landing at KSC because of rain within | |
| STS051-4 | 14-005 | 9/16/93 7:05:28 Duration | 3:15 3:12 | 47 KGS 265:07:56:43Z | Bottom: S First nigh | | | ENTRY RANGE: | | PAYLOADS: PLB: | - Waved off rev 142 landing at KSC because of rain within 30 nm. Extended flight 1 day minus 1 rev. (Total extension | |
| In-flight ci | | | NEG RETURN: | | KSC. | it iarium g | y at | 4250 NM | | ACTS/TOS | 15 revs.) ` ` | |
| portrait (It | | MCC FCR-1 (36) | 3:56 3:59 | AVE BRK DECEL: 6.9 FPS/S | | | | | | (DEPLOYED) ORFEUS-SPAS | FIRSTS: | |
| PLT Read | | FLIGHT DIRECTORS: | PTA (U/S 245): | <u>WHEELS STOP</u> : 265:07:56:56Z | | | | | | (DEPLOYED AND | FIRSTS: - First flight of drag chute with five ribbons removed First flight with night landling at KSC First flight with wake up music (used Heartbreak Hotel by Carl Walz) sung by a crewmember First flight with two U.S. and two Russian EVA's at same time. | |
| Bursch/M | | A/E - R. D. Jackson LD/O 1 - R. E. Castle | 5:15 5:07 | 10370 FT | | | e50 | | | RETRIEVED) LDCE (2 CANS) | - First flight with wake up music (used Heartbreak Hotel by Carl Walz) sung by a crewmember. | |
| Culbertso Walz/MS | | O 2 - R. M. Kelso | PTM (U/S 245): | ROLLOUT: | | | 1 | | | MIDDECK | | |
| Newman/ | | PLNG - N. W. Hale MOD - B. R. Stone | 6:12 6:06 | 8271 FT 50 SEC | | | | 10 M | | MIDDECK: IMAX | EVENTS: Fuel cell 1 shut down for 24 hours for DTO 412. | |
| | | | MECO CMD: 8:28.15 8:29.8 | WINDS: | | | -1 | | | CPCG - BLOCK-II CHROMEX, | RENDEZVOUS #15: - Rendezvous with ORFEUS-SPAS for grapple, berth, and | |
| | (1) - J.M. A. | | | T2, L1 KTS OFFICIAL: | | | 持为 | | | HRSGS-A, APE-B, | return. | |
| | THE PARTY OF THE P | 11111 | <u>VI</u> : 25873 25874 | H2, L1 | | | | 1 | | IPMP, RME-III, AMOS | NIGHT LANDING: Space Shuttle #6, first night landing at KSC. | |
| | OMION COM | 0 P | | DENS ALT: 1049 FT | | | 1 | A . | | | SIGNIFICANT ANOMALIES: | |
| | 100 100 M | | OMS-2: 39:53.7 39:53.7 | FLT DURATION: | | M PE | 1 | | | 4 CRYO TK SETS | SIGNIFICANT ANOMALIES: - Right SRB tilt HPU underspeed problem. (Scrub #2.) - SSME #2 fuel flow sensor A2 failed low. (Scrub #3.) - FA2 MDM BITE. | |
| V | A - A | | 222 FPS 222 FPS | 9:20:11:06 236:11:06 | | | | | | RMS 32 | - FA2 MDM BITE. - EECOM-01 - Loose thermal blanket on aft bulkhead. | |
| | | 3000 | | S/T: 385:19:23:28 | | | W 0 | | | (S.N. 201) | - FAZ MDM BTLE EECOM-01 - Loose thermal blanket on aft bulkhead PSA slider door stuck open Thruster L3L failed off Thruster R1R chamber pressure transducer failure (post-flight found fuel/oxidizer reaction products (FORP) in tube.) - TOS SuperZip damage, both detonation cords fired simultaneously damaging 1307 bulkhead and PLB blankets Humidity separator B water carryover. | |
| | | | | | | - 60 | - | | | RMS USED FOR | - Thruster R1R chamber pressure transducer failure (post-flight | |
| A. | | A STATE OF THE PARTY OF THE PAR | | OV-105: 109:13:02:15 | 100 | - | | - | - | SPAS DEPLOY, GRAPPLE AND | - TOS SuperZip damage, both detonation cords fired | |
| | | I May | | DISTANCE: 4,106,411 sm | | | and the | - | - | REBERTH | Isimultaneously damaging 1307 bulkhead and PLB blankets. - Humidity separator B water carryover | |
| | | | | 1110 H I I SIII | - | - | | | | I . | | |

| | | | SF | ACE SHU |) I I L L | IVIIO | 310 | 143 301 | MIMI | ANI | 1 age 2-03 - 010-00 |
|---|--|---|---|---|---|-------------|-----|--|------|---|--|
| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| SEQ FLT #58 KSC-58 PAD 39B-22 MLP-1 | Spacelab Flight Long Module 9 EDO 2 OMS PODS LPO5-4 RPO5-4 FRC2-15 A POS-4 FRC2-15 A POS- | CDR: John E. Blaha (Fit 4 - STS-29, STS-33 & STS-43) P316/R97/V48/M88 PLT: Richard A. Searfoss P317/R171/M149 M/S 1 (PAYLOAD CDR): M. Rhea Seddon (Fit 3 - STS 51-D & STS-40) P318/R55/V63/F5 M/S 2: William S. McArthur P319/R172/M150 M/S 3: David A. Wolf P320/R173/M151 M/S 4: Shannon W. Lucid (Fit 4 - STS 51-G, STS-34 & STS-43) P321/R65/V45/F6 P/S 1: Martin J. Fettman P322/R174/M152 Colorado State University MCC FCR-1 (37) FLIGHT DIRECTORS: A/E - N. W Hale LD/O 1 - L. J. Ham O 2 - P. L. Engelauf O 3 - G. E. Coen O 4 - J. F. Muratore MOD - A. L. Briscoe | AOA: EDW22/N/N PLS: EDW22/N/N TDEL: 0.00 0.82/0.12 MAX Q NAV: 687 PSF 684 PSF SRB STG: 1:58.9 1:59 PERF: NOMINAL 2 ENG TAL (BEN): 2:50 2:53 NEG RETURN: 4:02 4:06 PTA (U/S 218): 5:30 5:30 PTM (U/S 218): 6:19 6:18 MECO CMD: 8:33.5 8:36 VI: 25867 25862 OMS-2: 41.55 | EDW 22 CONC (EDW 39, CONC 20) 305:15:05:42Z 7:05:42 AM PST Monday 11 11/1/93 (8) DEORBIT BURN: 305:14:05:30Z XRANGE: 144 NM ORBIT DIR: DR 9 AIM PT: NOMINAL MLGTD: 3380 FT 305:15:05:42Z VEL: 205 KGS 198 KEAS HDOT: -2.2 FPS TD NORM 205: 2800 FT DRAG CHUTE DEPLOY: 173 KEAS 305:15:05:51Z NLGTD: 6948 FT 305:15:05:53Z VEL: 167 KGS HDOT: -3.7 FPS BRK INIT: 138 KGS DRAG CHUTE JETIISON: 47 KGS 305:15:06:52Z AVE BRK DECEL: 5.5 FPS/S WHEELS STOP: 305:15:06:44Z 13020 FT ROLLOUT: 9640 FT ROLLOUT: 9640 FT ROLLOUT: 9640 FT ROLLOUT: 9640 FT ROLLOUT: 975 RT KTS OFFICIAL: 12, R2 DENS ALT: 1827 FT FLT DURATION: 14:00:12:32 336:12:32 S/T: 399:19:36:00 OV-102: TZ:TT:33:12 | 104/104/ 109% PREDICTED: 100/100/100/ 67/104 ACTUAL: 100/100/100/ 69/104 1 = 2024 (7) 2 = 2109 (11) 3 = 2018 (11) M 3 EOM: WEIGHT: 229481 LBS X CG: 1078.8 LANDING: WEIGHT: 229369 LBS X CG: 1080.4 | | | DEORBIT: 151 X 136 NM VELOCITY: 25755 FPS ENTRY RANGE: 4378 NM | (3) | CARGO: 32011 LBS PAYLOAD CHARGEABLE: 23127 LBS DEPLOYED: 0 LBS NON-DEPLOYED: 23127 LBS MIDDECK: 1373 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 747275 LBS CARGO TOTAL: 1749548 LBS PERFORMANCE MARGINS (LBS): FPR: 3934 FUEL BIAS: 1055 FINAL TDDP: 767 RECON: 1114 PAYLOADS: PLB: SPACELAB LIFE SCIENCES (SLS-2/LM) Cardiopulmonary, Neurovascular, and Regulatory Physiology Experiments MIDDECK: SAREX-II 4 CRYO TK SETS + 4 EDO SETS NO RMS | KSC W/D: OPF 82, VAB 17, PAD 28 = 127 days total. LAUNCH POSTPONEMENTS: - Launch date was 8/25/93 as of 7/31/92 Postponed launch to 9/10/93, then 10/7/93 because of STS-55, STS-56, STS-57, and STS-51 launch delays. Postponed launch to 10/14/93 to replace two APU's. LAUNCH SCRUBS: - Scrubbed 10/14/93 launch at 16:57:20Z while holding at T-31 seconds when drainback time expired with 25M40S left in launch window. Scrub caused by range safety command system problem, and KSC weather caused lengthy hold Scrubbed 10/15/93 launch caused by S-Band PM transponder 2 problem. Rescheduled launch for 10/18/93 to change out transponder. LAUNCH DELAYS: - 10/18/93 launch delayed 10 seconds at T-5 minutes because of intruder aircraft in launch area. TAL WX: - Ben Guerir - prime and selected, Moron forecast and observed GO, Zaragoza forecast and observed NO-GO - rain. DOLILU/I-LOADS: - Nominal I-loads were selected. FLIGHT DURATION CHANGES: None. EVENTS: Special attitude flown for OARE data on FD 12. RECORDS: - Longest Shuttle flight - 14:00:12:32 - exceeds STS-50 by 4H42M28S (only exceeded by SKYLAB flights) Shannon Lucid set Shuttle flight time record - 34:22:52:09. SIGNIFICANT ANOMALIES: - S-band FM transmitter power output degraded Engine 1 and 2 dome-mounted heat shield blanket damage External tank intertank acreage loss of TPS Water leak at WSC/odor/bacteria filter, switched to WCS fan sep 2 (low torque), performed IFM using wand to remove water False low battery beep from AIU Payload recorder tape broke during track change Spacelab overhead container OH5 jammed LOMS PC failed off scale low RAHF-7 quad temps high - FCL FPV to P/L. |
| 0 | | | | <u>DISTANCE</u> : 5,840,450 sm | | | | | | | |
| | | | | | | | | | | - | |

| SPACE SHUTTLE MISSIONS SUMMARY Page 2-70 - ST | | | | | | | | | | | | | |
|--|---|--|---|---|---|---------------------|---------------------------|-------|-----|---|--|--|--|
| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, | | |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) | | |
| STS-61 SEQ FLT #59 KSC-59 PAD 39B-23 MLP-2 | OV-105 (Flight 5) Endeavour OMS PODS LPO3-16 RPO4-12 FRC5-5 | CDR: Richard O. Covey (Flt 4 - STS 51-I, STS-26 & STS-38) P323/R73/V30/M67 PLT: Kenneth D. Bowersox (Flt 2 - STS-50) P324/R146/V97/M130 M/S 1 AND EV3: Kathryn C. Thornton (Flt 3 - STS-33 & STS-49) P325/R107/V73/F11 M/S 2: Claude Nicollier (Flt 2 - STS-46) P326/R150/V98/M134 Switzerland M/S 3 AND EV 1: Jeffrey A Hoffman (Flt 4 - STS 51-D, STS-35 & STS-46) P327/R57/V59/M52 M/S 4, P/L CDR & EV 2: F. Story Musgrave (Flt 5 - STS-6, STS 51-F, STS-33 & STS-44) (P328/R15/V19/M15 M/S 5 AND EV 4: Thomas D. Akers (Flt 3 - STS-41 & STS-49) P329/R115/V74/M103 | 4:27:00 AM EST (A) Thursday 15 12/2/93 (4) LAUNCH WINDOW: 67 MINUTES, PLANAR WINDOW EOM PLS: KSC TAL: BYD TAL WX: BEN,MRN SELECTED: RTLS: KSC15/N/N TAL: BEN32/N/SF AOA: EDW04/N/N PLS: EDW04/N/N TDEL: 0.32 0.402/.44 MAX Q NAV: | KSC 33 (KSC 18) 347:05:25:33Z 00:25:33 AM EST Monday 12 12/13/93 (7) DEORBIT BURN: 347:04:14:45Z XRANGE: 3 NM ORBIT DIR: AR 6 AIM PT: NOMINAL MLGTD: 2903 FT 347:05:25:33Z VEL: 192 KGS 201 KEAS HDOT: -1.7 FPS TD NORM 195: 3415 FT DRAG CHUTE DEPLOY: 170 KEAS 347:05:25:41Z NLGTD: 6635 FT 347:05:25:45Z VEL: 148 KGS HDOT: -3.5 FPS BRK INIT: 118 KGS DRAG CHUTE JETTISON: 49 KTS 347:05:26:08Z AVE BRK DECEL: 6.6 FPS/S | 104/104/ 109% PREDICTED: 100/100/100/ 74/104 ACTUAL: 100/100/100/ 73/104 1 = 2019 (13) 2 = 2033 (5) 3 = 2017 (9) M3 EOM: WEIGHT: 212947 LBS X CG: 1078.9 LANDING: WEIGHT: 212836 LBS X CG: 1080.6 | /MS, CD //S, PLT | Crew: R Cove Bowers | | (4) | CARGO: 24363 LBS PAYLOAD CHARGEABLE: 17401 LBS DEPLOYED: 2308 LBS NON-DEPLOYED: 14428 LBS MIDDECK: 665 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 762368 LBS NON-DEPLOYED: 762368 LBS CARGO TOTAL: 1773911 LBS PERFORMANCE MARGINS (LBS): FPR: 3981 FUEL BIAS: 987 FINAL TDDP: 927 RECON: 554 PAYLOADS: PLB: HUBBLE SPACE TELESCOPE (HST) SERVICING MISSION (SM-1) (REPLACEMENT HARDWARE) ICBC | KSC W/D: OPF 103, VAB 6, PAD 33 = 142 days total. LAUNCH POSTPONEMENTS: - Launch date was 12/2/93 as of 7/17/92 Launch date was changed to 12/7/93, then 12/2/94, then 12/1/93 on 10/25/93 Moved from Pad A to Pad B to protect payload from contamination caused by Pad A sandblasting. LAUNCH SCRUBS: - 12/1/93 launch was scrubbed while holding at T-5 minutes when 67-minute window expired. Primary causes of delay were RTLS crosswind exceedence and rain within 20 nm. Other factors were BLAST, COLA, ceiling violation (6.5K broken), and intruder ship in SRB recovery area. LAUNCH DELAYS: None. TAL WX: - Banjul, Ben Guerir, and Moron all forecast and observed GO. DOLILU/I-LOADS: - DOLILU uplink #9, I-load uplink #15. NIGHT LAUNCH: Shuttle night launch #9. FLIGHT DURATION CHANGES: - Shortened flight one rev because cloud cover forecast to move in at nominal landing time. FIRSTS: - First flight with four EVA crewmembers First flight with five EVA's (alternating crew on alternating days) Minimum shuttle crossrange (3 nm). RENDEZVOUS #16: - Rendezvous with HST for grapple, berth, repair, and deploy. NIGHT LANDING: Space Shuttle #7, second night landing at KSC. SIGNIFICANT ANOMALIES: - Aft mission timer circuit breaker popped. | | |
| REFERENCE | W/COLLIER THE | MCC FCR-1 (38) FLIGHT DIRECTORS: A/E - R. D. Jackson LD/O 2-EVA - J. M. Heflin O 2-SYS - J. W. Bantle O 1 - R. E. Castle PLNG - J. F. Muratore MOD - B. R. Stone Continued | OMS-2: 42:39 43:30 | WHEELS STOP: 347:05:26:26Z 10825 FT ROLLOUT: 7922 FT 53 SEC WINDS: 6H, 0X KTS 0FFICIAL: H7, L1 Continued | | | | | | MIDDECK: IMAX AMOS 5 CRYO TK SETS RMS 33 (S.N. 303) RMS USED FOR HST GRAPPLE, SERVICE, AND DEPLOY, AND EVA WORK PLATFORM | In-suit drink bags leaked. Large in-suit drink bags not stowed. EMU 3 intermittent loss of 298.6 receive and all hardline comm. HST power tool S.N. 1001 failed. EMU 2 failed 0.5 psi leak check. -Y star tracker temporary loss. APU 2 gas generator/fuel pump heater failure. Right OMS helium tank pressure transducer P2 bias Jet L2U failed off. Loss of biomed data on EMU 2 during EVA #5. +V2 solar array outer bi-stem bowed, hence jettisoned old array. Missing TPS on forward edge of RSRM RH forward center segment. | | |

| | | | SP | ACE SHU | JTTLE | MIS | SIOI | NS SUI | MM/ | ARY | | Page 2-71 - STS-6 |
|---------------------|--|--|-------------------------------|--|----------------------------------|-------------|--------|------------------------|----------|---|----|---|
| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-61 Continued | | Continued EMU/TETHERED EVA'S: | | Continued | | N, Total | | | | | | |
| onanded | | EVA #1 - 12/4/93 SPACE SHUTTLE EVA #23 SCHEDULED EVA #19 BY EV 1 & EV 2 REPLACED RSU'S 2 & 3, ESU'S 1 & 3 AND RELATED GYRO FUSE PLUGS. | | DENS ALT: -1039 FT FLT DURATION: 10:19:58:33 259:58:33 | - TE | | Many | | | | | |
| | | 7H53M57S EVA #2 - 12/5/93 SPACE SHUTTLE EVA #24 SCHEDULED EVA #20 BY EV 3 & EV 4 REPLACED BOTH SOLAR ARRAYS, OLD +V2 ARRAY JETTISONED 6H35M3S | | <u>S/T</u> : 410:15:34:33 <u>OV-105</u> : 43:15:09:45 <u>DISTANCE</u> : 4,433,772 sm | | | | | | | â | |
| | 6H35M3S EVA #3 - 12/6/93 SPACE SHUTTLE EVA #25 BY EV 1 & EV 2 | SPACE SHUTTLE EVA #25 | | | | is bert | hed in | 2-04 Hubbi Endeavou | | rload (f | | I-050 Thornton on end of RMS d) and Akers install COSTAR during T repair. |
| | | REPLACED WIDE FIELD/PLANETARY CAMERA AND INSTALLED TWO MSS'S 6H47M28S | | | | | | 1993-1 | 2-09 A | 061-90-028 After servicing, new "Solar Wir | | 1 |
| | | EVA #4 - 12/7/93 SPACE SHUTTLE EVA #26 BY EV 3 & EV 4 SCHEDULED EVA #22 REPLACED HIGH SPEED PHOTOMETER WITH COSTAR AND INSTALLED | | | | | | HST Galax | cy photo | _wfpcHSTBeforbeforbeforbeforbeforbeforbeforbeforb | S. | |

HST Galaxy photo after repairs.







STS061-74-046 Hoffman on RMS and Musgrave installing Wide Field/Planetary Camera (WFPC II).

NEW COPROCESSOR 6H50M55S

EVA #5 - 12/8/93 SPACE SHUTTLE EVA #27 BY EV 1 & EV 2 SCHEDULED EVA #23 REPLACED SOLAR ARRAY DRIVE ELECTRONICS, GHRS REDUNDANCY KIT, MLI CONTAMINATION KITS FOR MSS'S, AND MANUALLY OPERATED BOTH SOLAR ARRAY PRIMARY DEPLOYMENT MECHANISMS 7H20M4S

| | SPACE SHUTTLE MISSIONS SUMMARY Page 2-72 - 515-60 LANDING SITE/ SSME-TL | | | | | | | | | | | | |
|--|---|--|--|--|-------------------------|--------------------------|-------------|-----------------------------------|--------------|---------------------------------------|---|--|--|
| | | CREW | | | | | | | | | | | |
| FLT | ORBITER | (6) | LAUNCH SITE, LIFTOFF TIME, | RUNWAY, | NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS | | |
| NO. | ORBITER | * * | LANDING SITES, | CROSSRANGE LANDING TIMES | THROTTLE | AND | INC | HA/HP | F5W | PAYLOADS/ | (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, | | |
| NO. | | TITLE, NAMES | ABORT TIMES | FLT DURATION, | PROFILE | ET | IIVC | 11/7/111 | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) | | |
| | | & EVA'S | | WINDS | ENG. S.N. | | | | | | | | |
| STS-60 | OV-103 (Flight 18) | CDR: Charles F. Bolden | KSC 39, PAD B 34:12:09:59.965Z | KSC 15 (KSC 19) 42:19:19:22Z | 104/104/ 109% | BI-062 | 57° (14) | DIRECT INSERTION | OI-22 (5) | <u>CARGO</u> : 28957 LBS | KSC W/D: OPF 81 VAB 5, PAD 22 = 108 days total. | | |
| SEQ FLT #60 | Discovery | (Flt 4 - STS 61-C | 7:10:00 AM EST (P) | 2:19:22 PM EST | | RSRM | (14) | | (5) | 20937 LD3 | LAUNCH POSTPONEMENTS: | | |
| | | ŠTS-31 & STS-45)) P330/R88/V52/M80 | 7:10:00 AM EST (P) 7:10:00 AM EST (A) | Friday | PREDICTED: | 35 | | POST OMS-2: 191 X 189 NM | | PAYLOAD CHARGEARIE | - 10/31/93 launch date baselined on 7/31/92, later changed to | | |
| KSC-60 | Spacehab 2 | P330/R88/V52/IVI80 | Thursday 16 2/3/94 (3) | Friday 6 2/11/94 (2) | 100/104/104/ 70/104 | ET-61 | | 191 X 189 NW | | CHARGEABLE: 22296 LBS | 10/21/93 and 11/10/93. - Postponed STS-60 to 1/20/94 and moved STS-61 ahead on | | |
| <u>PAD</u> 39A-37 | OMS PODS | PLT: | | | | | | ODERACS DEPLOY: | | | 9/2/93 (KSC work flows would not allow two flights before | | |
| 39A-37 | LPO1-21 RPO3-19 | Kenneth S. Reightler (Flt 2 - STS-48) | LAUNCH WINDOW: 2H30M CTOB | <u>DEORBIT BURN:</u> 42:18:18:45Z | ACTUAL: 100/104/104/ | LWT 54 | | <u>DEPLOY</u> : 6:02:43:24 MET | | DEPLOYED: 171 LBS | holidays). | | |
| MLP-3 | FRC3-18 | P331/R134/V99/M119 | | XRANGE: 376 NM | 70/104/ | 34 | | | | | LAUNCH SCRUBS: None. | | |
| | | M/S 1: | EOM PLS: KSC TAL: ZAROGOZA | ORBIT DIR: DL 31 | 1 = 2012 (15) | <u>et</u> <u>Pred</u> | | BREMSAT DEPLOY: | | NON-DEPLOYED: 21015 LBS | LAUNCH DELAYS: None. | | |
| | | N. Jan Davis | TAL ALT: MORON, | AIM PT: NOMINAL | 2 = 2034(4) | RPT | | 06:07:13:40 | | 21010 LD3 | LAUNCH DELATS. Notic. | | |
| | | (Flt 2- STS-47) | BEN GUERIR | | 3 = 2032 (2) | 285 K | | MET | | MIDDECK: 1110 LBS | TAL WX: | | |
| | | P332/R153/V100/F17 | SELECTED: | MLGTD: 2324 FT 42:19:19:22Z VEL: 192 KGS | | FT | | | | 1110 LBS | - Zarogoza was prime but forecast NO GO for visibility (rain/fog) and 4K ceiling; hence, Ben Guerir was selected. ZZA was | | |
| | | <u>M/S 2</u> : | RTLS: KSC33/CI/ N | VEL: 192 KGS 205 KFAS | M 3 EOM: WEIGHT: | BR/UP | | | | SHUTTLE ACCUMULATED | observed GO. | | |
| | | Ronald M. Sega P333/R175/M153 | TAL: BEN36/N/N AOA: NOR17/N/N | 205 KEAS HDOT: -2.3FPS | WEIGHT: 216663 LBS | 214 K | | <u>DEORBIT</u> : 194.4 X 189.1 | | ACCUMULATED WEIGHTS: | Moron forecast NO GO (headwinds and ceiling), observed NO GO (headwinds). | | |
| | | 1 333/1(173/191133 | PLS: EDW04/N/N | <u>TD NORM 195</u> : | X CG: | <u>ET</u> | | NM | | DEPLOYED: | ivo do (neadwinds). | | |
| | | M/S 3: | TDEL. | 3016 F I | 1079.6 | IMPACT | | VELOCITY. | | 766601 LBS | DOLILU/I-LOADS: | | |
| SEC | A | Franklin R. Chang-Diaz (Flt 4 - STS 61-C, | TDEL: 0.00 0.081/0.12 | DRAG CHUTE DEPLOY: 172 KEAS 42:19:19:32Z | LANDING: | 1:27:21 MET | | VELOCITY: 25858 FPS | | NON-DEPLOYED: 784493 LBS | - Both DOLILU and Nominal I-loads were GO. DOLILU was selected because they provided approx. 300 lbs performance | | |
| | THE CO. | STS-34 & STS-46) | NANY O NINY | | WEIGHT: | <u>LAT</u> : 2.69°N | | | | CARGO TOTAL: | selected because they provided approx. 300 lbs performance and 1.1-minute additional hold time. DOLILU uplink #10, total I- | | |
| | | P334/R89/V46/M81 | MAX Q NAV: 708 PSF 717 PSF | NLGTD: 7522 FT 42:19:19:41Z | 216595 LBS X CG: | 2.69°N LONG: | | ENTRY RANGE: | | 1802868 LBS | load uplink #16. | | |
| | 開 | M/S 4: | | VEL: 118 KGS HDOT: -4.1 FPS | 1081.3 | 123.2°W | | 4349 NM | | <u>PERFORMANCE</u> | FLIGHT DURATION CHANGES: | | |
| | 1 | Sergei Krikalev | <u>SRB STG</u> : 2:05.3 2:06 | | | | | | | MARGINS (LBS): FPR: 3981 | - Extended flight one orbit because KSC was forecast NO GO for ceiling and crosswinds | | |
| 8 | | (Flt 3 SOYUZ TM-7, MIR SOYUZ TM-12/MIR) | | BRK INIT: 97 KGS | | | | | | FUEL BIAS: 987 | nor centing and crosswinds | | |
| A * D | AVIS * | Russian Cosmonaut | PERF: NOMINAL | DRAG CHUTE JETTISON: | | | | | | FINAL TDDP: 110 | FIRSTS: | | |
| | | (P335/R176/M154 | 2 ENG TAL (BEN): | 52 KGS 42:19:19:55Z | | | | | | RECON: 306 | - First flight of Russian Cosmonaut on U.S. spacecraft (Krikalev's previous flights were Soyuz TM-7 and Soyuz TM-12 with more than 1 year 3 months aboard Mir.) | | |
| | | | 2:49 2:49 | | N | | | 0 | | PAYLOADS: | with more than 1 year 3 months aboard Mir.) | | |
| | | MCC FCR-1 (39) | NEG RETURN: | AVE BRK DECEL: 6.2 FPS/S | - | - | | | 1 | PLB: WSF-1 | SIGNIFICANT ANOMALIES: | | |
| | | FLIGHT DIRECTORS: | 4:03 4:06 | WHEELS STOP: | | W. W. | | | | SPACEHAB-2 | - Supply H20 dump valve leak (several burps after water | | |
| STS060-1 | | A/E - J. W. Bantle LD/O 2/C. W. Shaw | PTA (U/S 350): | 42:19:20:13Z 10144 FT | | Ch. | | 1 | | CAPL-1 ODERACS/ | dumps) Unable to place diffuser cap into tunnel adapter. | | |
| SPACEH | | O 1 - G. A. Pennington | 5:06 5:12 | | | ALL SHOW | | | | BREMSAT | - O₂ tank 2 quantity transducer erratic. | | |
| Payload E |) ov | PLNG - R. E Castle | DTM | ROLLOUT: 7820FT | | | | | | GBA | - ARD nominal margin showed major thrust/mass difference with | | |
| | | MOD - G. E. Coen | PTM: N/A | 51 SEC | Solve Solve | ST W | 1 | TE | | (WITH 4 GAS CANS) | on-board data. - Pilot HIU failed. | | |
| | | | | WINDS: | | 1 3 | | | | , | - Both MCC DVIS CPU's (A and B) went down). | | |
| and the | | THE RESERVE | MECO CMD: 8:33.1 8:32.7 | WINDS: H11, R1 OFFICIAL: | | | 7 | 3 | 1 | MIDDECK: SAREX-II | - Tunnel adapter stowage net, not stowed. - Hassleblad shutter failed. | | |
| 45 40 | | 3 | | H20, R0 | | | | | | APE-B | - Payload retention latch SW 2 position indicated release instead | | |
| | | A A STATE OF THE S | <u>VI</u> : 25924 25916 | DENS ALT: | ОТООСО | 04.000 | 0 | | | 4 CRYO TK SETS | of off Air/ground crosstalk from ICOM to A/G loop. | | |
| | | | | 1377FT | | | | squeezes | | | - Wakeshield horizon sensor signals had, hence, did not deploy | | |
| A STATE OF THE PARTY OF THE PAR | | | OMS-2: 42:17 42:17 | FLT DURATION: 8:07:09:22 | | | | CEHAB in | | RMS 34 | WSF resulting in limited scientific data. | | |
| | | | 268 FPS 268 FPS | 8:07:09:22 199:09:22 | | | | upper right | - | (S. N. 201) | - WOW WONG anomaly. | | |
| 1000 | | | | <u>S/T</u> : 418:07:43:55 | | | | him are: | | RMS used for WSF | | | |
| | | September 1 | | <u>OV-103</u> : 117:20:12:37 | Sega/MS | | | | | deberth but did not deploy because of | | | |
| 110000 | | | | | Diaz/PL0 | | | | | WSF problems | | | |
| | | | | DISTANCE: 3,439,704 sm | Russian | on U.S. | space | ecraft, and P | 'L I | | | | |
| | | | | 10, 107,107 3111 | | | | | | 1 | | | |

| SPACE SHOTTLE IVISSIONS SUIVINANT | | | | | | | | | | | | |
|-----------------------------------|--|--|--|--|---|--|---------------------|--|--|---|---|--|
| FLT | ORBITER | CREW (5) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, | |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) | |
| SEQ FLT #61 KSC-61 | OV-102 (Flight 16) Columbia EDO 3 | CDR: John H. Casper (Flt 3 - STS-36 & STS-54) P336/R111/V86/M99 PLT: | KSC 39, PAD B 63:13:52:59.97Z 8:53:00 AM EDT (P) 8:53:00 AM EDT (A) Friday 9 3/4/94 (4) | KSC 33 (KSC 20) 77:13:09:41Z 08:09:41 AM EST Friday 7 3/18/94 (4) | 104/104/ 109% PREDICTED: 100/104/104/ 67/104 | BI-064 RSRM 36 KM ET-62 | 39° (3) | DIRECT INSERTION POST OMS-2: 163 X 161 NM | (6) | CARGO: 30016 LBS PAYLOAD CHARGEABLE: 19792 LBS | KSC W/D: OPF 62, VAB 5, PAD 19 = 86 days total. LAUNCH POSTPONEMENTS: - 2/8/94 launch date baselined on 10/2/92 Postponed launch to 2/24/94 on 9/2/93 Postponed launch to 3/3/94 on 10/20/93. | |
| 39B-24 MI D-1 | OMS PODS: LPO5-5 RPO5-5 FRC2-16 | Andrew M. Allen (Fit 2 - STS-46) P337/R149/V101/M133 M/S 1 (PAYLOAD CDR): Pierre J. Thuot (Fit 3 - STS-36 & STS-49) | LAUNCH WINDOW: 2H30M, CTOB EOM PLS: KSC TAL: BEN TAL WX: MRN, ZZA | <u>DEORBIT BURN:</u> 77:12:16:50Z <u>XRANGE:</u> 116 NM <u>ORBIT DIR:</u> DR 10 <u>AIM PT</u> : NOMINAL | ACTUAL: 100/104/104/ 67/104 1 = 2031 (9) 2 = 2109 (12) | LWT 55 ET PRED RPT 271K | | OMS-3: 9:17:09:39 MET 33.4 FPS 161 X 180 NM OMS-4: 9:17:50:30 MET | | DEPLOYED: 0 LBS NON-DEPLOYED: 18512 LBS | LAUNCH SCRUBS: - Scrubbed 3/3/94 launch at L-16 hours because excessive RTLS winds were forecast. LAUNCH DELAYS: None. | |
| | | P338/R112/V72/M100 M/S 2: Charles D. (Sam) Geman | SELECTED: RTLS: KSC33/CI/N TAL: BEN36/N/N AOA: KSC33/CI/N PLS: EDW04/N/N | MLGTD: 2905 FT 77:13:09:412 VEL: 210 KGS 207 KEAS HDOT: -3.4 FPS TD NORM 205: 2974 FT | 2 = 2109 (12) 3 = 2029 (8) M 3 EOM: WEIGHT: 228360 LBS X CG: 1082.6 | ET BKUP 214K ET IMPACT 1:27:04 | | 37.6 FPS 140 X 140 NM OMS-5: 11:18:15:34 MET 37.6 FPS 140 X 105 NM | | MIDDECK: 1280 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 766601 LBS NON-DEPLOYED: | TAL WX: - Ben Guerir, Moron, and Zaragoza were forecast and observed GO, Ben Guerir was prime and selected. NOMINAL/DOLILU/I-LOADS: - Nominal I-loads were NO-GO with PLB torque box indicator at 102 percent. DOLILU was selected and uplinked. DOLILU #11, | |
| | St. 82 | Marsha S. Ivins (Fit 3 - STS-32 & STS-46) P340/R109/V77/F12 MCC FCR-1 (40) | TDEL: 0:00 0.162/0.20 MAX Q NAV: 709 ~708 SRB STG: 2:05.4 2:05 | DRAG CHUTE DEPLOY: 166 KEAS 77:13:09:55Z NLGTD: 8764 FT 77:13:10:00Z VEL: 148 KGS HDOT: -3.7 FPS | LANDING: WEIGHT: 228250 LBS X CG: 1084.1 | MET <u>LAT</u> : 8.1°N <u>LONG</u> : 132.9°W | | DEORBIT: 138 X 105 NM VELOCITY: 25708 FPS | | 804285 LBS CARGO TOTAL: 1832884 LBS PERFORMANCE MARGINS (LBS): FPR: 3981 | total I-load uplink #17. FLIGHT DURATION CHANGES: None. FIRSTS: - First flight of DC vacuum cleaner First flight of Ku-Band Comm Adapter (KCA) uplink video. | |
| PAROL | | | <u>PERF</u> : NOMINAL <u>2 ENG TAL (BEN)</u> : 2:41 2:44 <u>NEG RETURN</u> : | BRK INIT: T23 KGS DRAG CHUTE JETIISON: 57 KGS 77:13:10:22Z AVE BRK DECEL: | | | | ENTRY RANGE: 4391 NM | | FUEL BIAS: 987 FINAL TDDP: 871 RECON: 1795 PAYLOADS: PLB: U. S. Microgravity Payload (USMP-2) | SIGNIFICANT ANOMALIES: - Galley overdispensed hot water Excessive gas bubbles in food containers WCS Fan Sep 1 stalled and popped all three circuit breakers Water Coolant Loop 1 accumulator quantity transducer drift Supply Water Tank B transducer dropout. | |
| Dexterous Also seen | STS062-81-024 Features activity with Dexterous End Effector (DEE) on RMS. Also seen are U.S. Microgravity Payload 2 (USMP) and OAST-2. | | 4:00 4:02 PTA (U/S 250): 5:09 5:07 PTM (U/S 250): 6:03 6:02 | 7 FPS/S WHEELS STOP: 77:13:10:35Z 13071 FT ROLLOUT: 10166 FT 54 SEC WINDS: | | | | | THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED IN COLUMN TW | Payload (USMP-2) Solidification of metals and semiconductors dendritic growth OAST-2 Technology experiments DEE SSBUV/A | Cryo H₂ Tank A heater failure. Mid-port and Mid-starboard PLB floodlight failures. O₂ Tank 7 quantity measurement failure. TV Cameras A, D, and end effector problems. Ops Recorder poor quality data on several tracks. APU 3 high fuel pump inlet pressure (line froze). LBNP fuse blew when vacuum cleaner operated., caused by a 20-volt peak-to-peak ripple PDIP power failure. | |
| | • | | 8:30.8 VI: 25886 25877 OMS-2: 42:19.7 42:19.7 208 FPS 208 FPS | T4, L3 KTS OFFICIAL: 1905P08 T4, L3 DENS ALT: 333 FT FLT DURATION: 13:23:16:41 335:16:41 | A A | 122 | 7 | | Br | LDCE MIDDECK: APCG, PSE, CPCG, CGBA, MODE, AMOS, APE-B 4 CRYO TK SETS + 4 EDO | - KCA comm link anomaly. RADIATOR DEPLOYED #15 (PORT RADIATOR ONLY). | |
| 948 33 1 | 200000 51252 | | | S/T: 432:22:00:36 <u>OV-102</u> : 136:16:49:53 <u>DISTANCE</u> : 5,820,146 sm | | R Caspet to right) | er (left) are Pl | | S. | RMS 35 (S.N. 301) RMS used for DEE tests | | |

| | | | Page 2-74 - STS-59 | | | | | | | | |
|--|-------------------------|--|---------------------------------------|---|-------------------------------|--|-------------|----------------------------------|-------|---------------------------------|---|
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
| EL T | ODDITED | (6) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | EC/A/ | PAYLOAD | MISSION HIGHLIGHTS |
| FLT NO. | ORBITER | | LIFTOFF TIME, LANDING SITES, | CROSSRANGE LANDING TIMES | EMERG THROTTLE | RSRM AND | INC | HA/HP | FSW | WEIGHTS, PAYLOADS/ | (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, |
| NO. | | TITLE, NAMES | ABORT TIMES | FLT DURATION, | PROFILE | ET | IIVC | ПАУПР | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | & EVA'S | ADOINT TIMES | WINDS | ENG. S.N. | | | | | EM EMINENTS | TINGTO, SIGNITIONIVI MIVOWINEIES, ETG.) |
| STS-59 | OV-105 | CDR: | KSC 39, PAD A | FDW 22, CONC | 104/104/ | BI-065 | 57° | DIRECT | OI-22 | CARGO: | KSC W/D: OPF 67, VAB 5, PAD 21 = 93 days total. |
| | (Flight 6) Endeavour | Sidney M. Gutierrez (Flt 2 - STS-40) | 99:11:04:59.99Z 7:05:00 AM EDT (P) | EDW 40, CONC 21 110:16:54:30Z | 109% | RSRM | (15) | INSERTION | (7) | 33758 LBS | LAUNCH POSTPONEMENTS: |
| SEQ FLT #62 | Lilucavoui | P341/R129/V102/M116 | 7:05:00 AM EDT (A) | 9:54:30 AM PDT | PREDICTED: | 37 | | POST OMS-2: | | PAYLOAD | - Baselined 9/30/93 launch date on 3/11/92. |
| KSC-62 | | DI T | Saturday 4 4/9/94 (11) | | 100/100/100/ | FT (2 | | 121 X 121 NM | | CHARGEABLE: 27447 LBS | - Postponed launch date to 4/14/94 on 12/21/92. |
| DVD | OMS PODS: | <u>PLT</u> : Kevin P. Chilton | 4/9/94 (11) | ` ' | 67/104 | ET-63 | | | | 2/44/ LBS | - Advanced launch date to 3/31/94 on 4/2/93. - Postponed launch date to 4/7/94 on 11/5/93. |
| 30V 38 | ILPO4-5 | (Flt 2 - STS-49) | LAUNCH WINDOW: 2H30M (CTOB) | DEORBIT BURN: 110:16:00:35Z | ACTUAL: 100/100/100/ | LWT- 56 | | | | DEPLOYED: | · |
| MI P-2 | RPO1-19 FRC5-6 | P342/R145/V103/M129 | 2H30M (CTOB) | | 100/100/100/ 67/104 | ET | | | | 0 LBS | LAUNCH SCRUBS: - Scrubbed 4/7/94 launch approximately 6 hours into count on |
| | I KC5-0 | <u>M/S 1</u> : | EOM PLS: KSC | | 07/104 | PRED | | | | NON-DEPLOYED: | 4/4/94 to borescope HPOTP preburner volute diffuser vane fillet |
| | | Jerome (Jay) Apt | EOM PLS: KSC TAL: ZZA | ORBIT DIR: DR 11 | 1 = 2028 (8) | RPT | | | | 27447 LBS | for undersized radii. |
| | | (Flt 3 - STS-37 & STS-47) | | | 2 = 2033 (6) 3 = 2018 (12) | 271.3K | | | | MIDDECK: | - Scrubbed 4/8/94 launch while holding at t-5 minutes. RTLS crosswinds exceeded limits. Decision made to count down to |
| | | P343/R123/V79/M110 | SELECTED: | 110.12.1.207 | | <u>ET</u> | | | | 1445 LBS | launch 1 hour earlier than nominal launch time on 4/9/94 to |
| | | M/C 2. | RTLS: KSC15/CI/N | VEL: 228 KGS | M 3 EOM: WEIGHT: | <u>BKUP</u> 214K | | DEODDIT. | | CHUTTLE | improve launch probability (11:05Z vs 12:05Z). |
| | | M/S 2: Michael R. Clifford | TAL: ZZA30/CI/N AOA: NOR23/N/N | 215 KEAS HDOT: -3.7 FPS | 221981 LBS | 214K | | <u>DEORBIT</u> : 112 X 110 NM | | SHUTTLE ACCUMULATED | LAUNCH DELAYS: None. |
| | | (Flt 2 - STS-53) | PLS: NOR23/N/N | TD NODM OOF | X CG: | ET | | | | WEIGHTS: | - Launched 1 hour early as planned. |
| OF. | 7.0 | P344/R157/V104/M139 | TDEL: | 2636 FT | 1079.4 | <u>IMPACT</u> 1:13:00 | | VELOCITY: 25660 FPS | | DEPLOYED: 766601 LBS | TAL WX: |
| TIERHE | CHILI | M/S 3 (PAYLOAD CDR): | <u>TDEL</u> : .16 .042/.08 | DRAG CHUTE DEPLOY: 180 KEAS | LANDING: | MET | | | | NON-DEPLOYED: | - Zaragoza, Ben Guerir, and Moron forecast and observed GO. |
| S CONTRACTOR OF THE PARTY OF TH | 3 | Linda M. Godwin | | <u>DEPLOY</u> : 180 KEAS 110:16:54:41Z | WEIGHT: | 45.0°N | | ENTRY RANGE: | | 831732 LBS | ŭ |
| E C | 10 8 | (Flt 2 - STS-37) P345/R122/V105/F13 | MAX Q NAV: 701 >694 | | 221865 LBS X CG: | 158.06°E | | <u>RANGE</u> : 4468 NM | | CARGO TOTAL: 1866642 LBS | DOLILU/I-LOADS: - DOLILU selected because WINGAR18 10 percent more |
| ä . | 15 T 8 | | | 110:16:54:45Z VEL: 171 KGS | 1081.2 | | | 110011111 | | | margin than nominal. DOLILU uplink #12, I-load uplink #18. |
| B. | V | M/S 4: Thomas D. Jones | <u>SRB STG</u> : 2:04 2:05 | VEL: 171 KGS HDOT: -4.4 FPS | | | | | | PERFORMANCE MARGINS (LBS): | FLICHT DUDATION CHANCES. |
| SRI | L-1 10 | P346/R177/M155 | 2.04 2.03 | BRK INIT: | | | | | | FPR: 3981 | FLIGHT DURATION CHANGES: - Changed from 9 to 10 days to acquire more science. - Waved off landing at KSC on orbits 166 and 167 for fore- cast |
| | | | <u>PERF</u> : NOMINAL | 118 KGS | | | | | | FUEL BIAS: 987 | - Waved off landing at KSC on orbits 166 and 167 for fore- cast |
| | | MCC FCR-1 (41) | 2 FNG TAL (MRN): | DRAG CHUTE | | | | | | FINAL TDDP: 2856 RECON: 1731 | and observed ceiling violations and rain within 30 nm. Extended flight a second day. |
| | | FLIGHT DIRECTORS: | 2 ENG TAL (MRN): 2:57 2:56 | JETTISON: 49 KGS | | | | | | REGOIV. 1731 | - Waved off landing on orbit 182 due to observed ceiling violations and forecast rain within 30 nm. Waved off landing |
| | | A/E/O 1 - R. D. Jackson LD/O 2 - G. A. Pennington | NEG RETURN: | 110:16:55:12Z | | | | | | <u>Payloads</u> : PLB: | violations and forecast rain within 30 nm. Waved off landing at KSC due to observed and forecast rain. Landed at EDW on |
| | | O 3 - R. E. Castle | 4:04 4:04 | AVE BRK DECEL: | - | | | | | SPACE RADAR | orbit 183. |
| | | MOD - B. R. Stone | | 7.6 FPS/S | | 1. + * * * * * * * * * * * * * * * * * * | *** | C N | V | LABORATORY | - Flight extended 2 days plus one orbit. |
| | | | PTA (U/S 190): 5:47 5:38 | WHEELS STOP: 110:16:55:23Z | * | 100 × 100 | A PROPERTY. | | 3 | (SRL-1) SIR-C/X-SAR | SIGNIFICANT ANOMALIES: |
| | | | | 12255 FT | | | | | 1 | SIR-C/X-SAR IMAGING OF | - Right SSME HPOTP turbine discharge temp A biased low |
| 433-1 | | | DROOP (ZZA) 5:28 5:42 | ROLLOUT: 10636 FT | 4 | 4. | 1 | A | 5 | EARTH'S SURFACE CONCAP IV | (200 degree delta to CH B) |
| - | | | | 53 SEC | | | 199 | | | GAS (4) | - Bubbles in water from SORG ((caused by venturi effect) Defective (split) LiOH can casing, no LiOH spilled FES Feedline A Heater 1 thermostat failure. |
| - | The same | | PTM (U/S 190): | <u>WINDS:</u> T1, R2 KTS | - | | | | | | - FES Feedline A Heater 1 thermostat failure. |
| 100 | | THE PARTY OF THE P | 6:08 5:56 | T1, R2 KTS OFFICIAL: 0204 | | - | _ V | -//- | 40 | MIDDECK: STL (2) | - H₂ Tank 5 check valve failed to seat. - Sticky cryo H₂ Tank 2 check valve. |
| | San And S | SEA SEA | MECO CMD: | T4. R2 | | 1 | A | | | VFT-4 | - GPS DTO status bit static. |
| 1000 | 1 | A.C. | 8:34:3 | DENS ALT: | | 1 | 1 | | | SAREX II | - MADS recorder tape broke Ku-band Channel 3 interferes with Channel 2. |
| Sec. 2 | | 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | \/I. | 3/64 F I | P. Dell. | | | | - 11 | 5 CRYO TK SETS6 | - Ku-band range/elevation unit digit inoperative. |
| 200 | 100 | | <u>VI</u> : 25778 25774 | FLT DURATION: 11:05:49:30 | | | | | | RMS 36 | - Side hatch window impact crew reported. |
| STS059-9 | S-076 Thre | e dimensional | ll . | 269:49:30 | STS059-4 | 4-004 C | rew in | middeck: CDI | R | (S.N. 303) | - GO ₂ vent arm on pad damaged, caused by shuttle plume effect. |
| | | a in western | OMS-2: 35:09.2 35:10.3 | <u>S/T</u> : 444:03:50:06 | | | | flanked by | | RMS NOT USED | CHOOL. |
| | | Earth Surface | 163.5 FPS 163.7 FPS | OV-105: | | | | back row are | | PER PLAN | |
| Imaging). | . ` | | | DISTANCE: | | | Chilton, | Godwin/PLC | , & | | |
| | | | | 4,704,835 sm | Clifford/M | S. | | | | | |

| | | | SP | MM. | ARY | Page 2-75 - STS-65 | | | | | |
|------------------------------------|---|--|---|--|--|---|-------------------|---|----------------|--|---|
| FLT NO. | ORBITER | CREW (7) TITLE, NAMES | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, | SSME-TL NOM-ABORT EMERG THROTTLE PROFILE | SRB RSRM AND ET | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-65 SEQ FLT #63 KSC-63 | OV-102 (Flight 17) Columbia 14th Spacelab | & EVA'S CDR: Robert D. Cabana (Fit 3 - STS-41, STS-53) P347/R113/V84/M101 PLT: | KSC 39, PAD A 189:16:42:59.977Z 12:43:00 AM EDT (P) 12:43:00 AM EDT (A) Friday 10 7/8/94 (3) | WINDS KSC 33 (KSC 21) 204:10:38:00Z | ENG. S.N. 104/104/ 109% PREDICTED: 100/104/104/ 67/104 | BI-066 RSRM 39 KM | 28.45° (36) | DIRECT INSERTION POST OMS-2: 163 X 160 NM | OI-23 (1) | | KSC W/D: OPF 62, VAB 5, PAD 20 = 87 days total. LAUNCH POSTPONEMENTS: - Baselined launch date of 6/23/94 on 4/2/93 Postponed launch date to 7/8/94 on 4/15/93. |
| PAD 39A-39 MLP-3 | Flight Long Module 10 EDO 4 OMS PODS: LPO5-6 | James D. Halsell, Jr. P348/R178/M156 M/S 1 (PAYLOAD CDR): Richard J. Hieb (Flt 3 - STS-39, STS-49) P349/R128/V70/M115 M/S 2: | LAUNCH WINDOW: 2H30M CTOB EOM PLS: KSC TAL: BYD TAL WX: BEN SELECTED: | DEORBIT BURN: 204:09:40:38Z XRANGE: 180 NM ORBIT DIR: DL 32 AIM PT: NOMINAL MLGTD: 2996 FT | ACTUAL: 100/104/104/ 67/104 SSME S/N: 1 = 2019 (14) 2 = 2030 (9) 3 = 2017 (10) | LWT 57 ET PRED RPT ET | | | | DEPLOYED: 0 LBS NON-DEPLOYED: 22521 LBS MIDDECK: 1761 LBS | LAUNCH SCRUBS: None LAUNCH DELAYS: None TAL WX: - Banjul (prime & selected) forecast and observed GO Ben Guerir forecast NO GO (rain) but observed GO. DOLILU/I-LOADS: |
| Organia M | RPO5-6 FRC2-17 | Carl E. Walz (Flt 2 - STS-51) P350/R170/V106/M148 M/S 3: Leroy Chiao P351/R179/M157 M/S 4: | SELECTED: RTLS: KSC 15/N/N TAL: BYD 32/N/N TAL: BYD 32/N/N PLS: EDW 22/N/N PLS: EDW 22/N/N TDEL: 0.19 -0.048/-0.01 MAX Q NAV: | 704:10:38:002 704:10:38:002 VEL: 207 KGS 199 KEAS HDOT: -2.5 FPS TD NORM 205: 2501 FT DRAG CHUTE DEPLOY: 174 KEAS | M 3 EOM: WEIGHT | ET IMPACT 1:21:08 MET LAT: 13.6°S LONG: | | DEORBIT: 137 X 127 NM VELOCITY: 25720 FPS ENTRY RANGE: | | SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 766601 LBS NON-DEPLOYED: 856014 LBS CARGO TOTAL: | - Both DOLILU and NOMINAL I-loads were GO, NOMINAL I-loads were selected, no uplink required. FLIGHT DURATION CHANGES: - Waved off landing at KSC on orbits 220 and 221 due to forecast and observed rain and potential lightening. Extended flight 1 day. |
| THE CHIAO | THOMAS HUTE | Donald A. Thomas P352/R180/M158 P/S 1: Chiaki Naito-Mukai P353/R181/F23 (Japan - NASDA) | 673 677 SRB STG: 2:03.8 2:05 PERF: NOMINAL | 204:10:38:09Z NLGTD: 8313 FT 204:10:38:18Z VEL: 138 KGS HDOT: -5.7 FPS BRK INIT: 115 KGS | 229261 LBS X CG: 1080.1 | 163.3°W | | 4381 NM | | PERFORMANCE MARGINS (LBS): FPR: 3981 FUEL BIAS: 987 FINAL TDDP: 2169 RECON: 3531 | SIGNIFICANT ANOMALIES: - Supply water dump nozzle icing occurred on third dump on FD3. FES was used to dump water for the rest of flight WCS problems included commode fault during compaction, commode filter fit and odor problems, and fan sep 1 stall and liquid backflow IMU redundant rate BITE messages RCS vernier thruster R5D failed off, then nominal ops Low wastewater dump flow. Second dump in three cycles. |
| STS065-4 Spacelab in payload | (IML-2) | MCC FCR-1 (42) FLIGHT DIRECTORS: A/E/O1 - J. W. Bantle LD/O 2 - J. M. Heflin O 3 - R. E. Castle O4 - P. L. Engelauf MOD - A. L. Briscoe | NEG RETURN: 4:00 4:01 PTA (U/S 244): 5:12 5:01 | DRAG CHUTE JETTISON: 52 KGS 204:10:38:43Z AVE BRK DECEL: 5.7 FPS/S WHEELS STOP: 204:10:39:08Z 13207 FT | | | Drea | | | PAYLOADS: PLB: INTERNATIONAL MICROGRAVITY LABORATORY LIFE SCIENCES AND MATERIAL | Third dump required seven cycles. Ops recorder 2 track 2 poor dump quality. Galley rehydration station did not dispense cold water. Arriflex magazine jams, Hasselblad jam and lens stuck. |
| | | | DROOP (BYD): 5:31 5:27 PTM: 6:03 5:50 MECO CMD: 8:32 8:31 VI: 25877 25870 | ROLLOUT: 10211 F1 68 SEC WINDS: 13,0X KTS OFFICIAL: 1503P04 13,0X KTS DENS ALT: 840 FT FLT DURATION: 14:17:55:00 353:55:00 | STS065-2 | 20-019 C | rew no | se in SL: Fro | | SCIENCES EXPERIMENTS (IML-2/LM) OARE MIDDECK: CPCG MAST AMOS SAREX-II | |
| | | | OMS-2: 39:55 39:55 221 FPS 221 FPS | <u>S/T</u> : 458:21:45:06 <u>OV-102</u> :151:10:44:53 <u>DISTANCE</u> : 6,143,846 sm | row: CDR & Mukai/ | Cabana PS (NAS b/PLC, 1 | flanke SDA). E | d by PLT Hal Back row: (lef s/MS, Walz/M | lsell ft to | 4 + 4 EDO CRYO TANK SETS NO RMS | STS065-214-037 DR.Chiaki Naito-Mukai enters IML-2 science module in cargo bay to conduct microgravity experiments. |

| | | | | 42 201 | ALIAL | | Page 2-76 - \$1\$-64 | | | | |
|---|--|--|---|--|---|--|---------------------------|---|--------------|--|--|
| FLT | ORBITER | CREW (6) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| SEQ FLT #64 | OV-103 (Flight 19) Discovery OMS PODS: LPO1-22 | CDR: Richard N. Richards (Fit 4 - STS-28, STS-41, STS-50) P354/R101/V55/M92 | | 263:21:12:52Z 2:12:52 PM PDT Tuesday 10 | 104/104/ 109% PREDICTED: 100/100/100/ 67/104 | BI-068 RSRM 41 ET-66 | | DIRECT INSERTION POST OMS-2: 141 X 140 NM | OI-23 (2) | CARGO: 25621 LBS PAYLOAD CHARGEABLE: 20417 LBS | <u>KSC W/D</u> : OPF 125, VAB 8, PAD 20 = 153 days total. <u>LAUNCH POSTPONEMENTS</u> : - Launch date was 6/16/94 on 2/19/93 Launch date postponed to 9/15/94 on 4/2/93 Launch date advanced to 9/9/94 on 11/19/93. |
| 376 23 | RPO3-20 FRC3-19 | PLT: L. Blaine Hammond (Flt 2 - STS-39) | LAUNCH WINDOW: 2H30M CTOB | DEORBIT BURN: 263:20:17:00Z | ACTUAL: 100/100/100/ | LWT 59 | | | | <u>DEPLOYED</u> : 0 LBS | LAUNCH SCRUBS: None |
| MLP-2 | * Harmon | P355/R124/V107/M111 <u>M/S 1:</u> Jerry M. Linenger P356/R182/M159 | EOM PLS: KSC TAL: ZZA TAL WX: MRN, BEN SELECTED: | | 67/104 1 = 2031 (11) 2 = 2109 (13) 3 = 2029 (10) | ET PRED RPT 271K | | | | NON-DEPLOYED: 16212 LBS MIDDECK: 1363 LBS | LAUNCH DELAYS: - Launch delayed 1H52M55S. Held at T-9 minutes for 1H34M18S because of detached opaque thunderstorm anvil and thunderstorms within 20 nm. Picked up count and held at T-5 minutes for 13M37S until KSC weather was GO. |
| * CHIEF | MEADE . | M/S 2: Susan J. Helms (Flt 2 - STS-54) P357/R158/V108/F19 | RTLS: KSC 15/CI/N TAL: ZZA AOA: NOR 17/N/N PLS: EDW 22/N/N | 198 KEAS HDOT: -1 FPS | M 3 EOM: WEIGHT: 212294 LBS X CG: | ET BKUP 214K ET IMPACT | | <u>DEORBIT:</u> 132.4 X 127.8 NM <u>VELOCITY</u> : | | SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 766601 LBS | TAL WX: - Zaragosa (prime and selected) Moron and Ben Guerir were all three forecast and observed GO. DOLILU/I-LOADS: |
| MCC FCR-1 | | M/S 3/EV2: Carl J. Meade (Flt 3 - STS-38, STS-50) P358/R117/V76/M105 | TDEL: 0.19: -0.088/-0.05 MAX Q NAV: | TD NORM 195: 2627 FT DRAG CHUTE DEPLOY: 184 KEAS | 1082.3 <u>LANDING</u> : WEIGHT: | 1:13:57 MET <u>LAT</u> : 43.3°S | | 25727 FPS ENTRY RANGE: | | NON-DEPLOYED: 873589 LBS CARGO TOTAL: 1925143 LBS | - Both NOMINAL and DOLILU were GO. NOMINAL I-loads were selected, no uplink required. FLIGHT DURATION/LANDING SITE CHANGES: |
| FLIGHT DIRE A/E/O1 - N. W LD/O 2 - G. A Pennington PLNG - W. D MOD - B. R. S | V. Hale . Reeves | M/S 4/EV1: Mark C. Lee (Fit 3 - STS-30, STS-47) P359/R100/V78/M91 SS EVA #28 | 688 691 SRB STG: 2:03 PERF: NOMINAL | NLGTD: 6192 FT 263:21:13:03Z VEL: 163 KGS HDOT: -6.7 FPS BRK INIT: 133 KGS | 212180 LBS X CG: 1083.9 | LONG: 155.5°W | | 4433 NM | | PERFORMANCE MARGINS (LBS): FPR: 3981 FUEL BIAS: 987 FINAL TDDP: 6409 RECON: 9639 | - Flight was 9+1+1 and was extended 1 day for science Waved off landing at KSC on orbits 159 and 160 due to forecast of lightening and thunderstorms with 30 nm and ceiling violations. Extended another day for weather Waved off landing at KSC on orbits 175 and 176 due to ceiling and rain within 30 nm. Decision made to change landing site to EDW. |
| STS064-1 Meade test the ne | & Lee) ew | SAFER FF #1 SCHEDULED EVA #24 9/16/94 EV1 - MARK LEE EV2 - CARL MEADE 6H51M35S DURATION | 2 ENG TAL (MRN): 2:38 2:37 NEG RETURN: 4:08 4:10 | DRAG CHUTE JETTISON: 56 KGS 263:21:13:31Z AVE BRK DECEL: 4.6 FPS/S | Øn. | 1 1 | | | 1 | PAYLOADS: PLB: LIDAR In-Space Technology Experiment Atmospheric | FLIGHT EXTENSION: 2 days plus 2 orbits. LANDING SITE CHANGE: KSC to EDW due to KSC weather. RENDEZVOUS #17: To retrieve, berth, and return |
| EVA Reso (SAFER). | | EVALUATED SAFER PERFORMANCE | PTA (U/S 250): 4:45 4:43 DROOP (ZZA): | WHEELS STOP: 263:21:13:53Z 12042 FT ROLLOUT: | | 2 | | | | Research using Laser (LITE) SPARTAN-201 | SPARTAN-201, which was deployed earlier in flight. SIGNIFICANT ANOMALIES: - FES feedline A accumulator temperature decreased below |
| | | / | 5:28 5:31 PTM: 5:31 5:28 MECO CMD: | ROLLOUT: 12045 FT 61 SEC WINDS: 10H, 3L KTS OFFICIAL: 0204P09 | | | | | • | Astronomy (Deploy & retrieve) GBA ROMPS MIDDECK: | thermostat spec Torn AFRSI blanket on left OMS pod Supply H ₂ O dump valve leakage (burp) FES outlet temperature oscillations during radiator bypass AFT MCA 1 OP STAT 4 indication Articulating portable foot restraint simulator fit interference. |
| | V. | 3 | 8:35.3 VI: 25805 25800 | H4, L2 KTS <u>DENS ALT</u> : 4927 FT <u>FLT DURATION</u> : 10:22:49:57 262:49:57 | | | | CDR Richa | | SSCE, BRIC, RME-III, MAST, SAREX-II, AMOS 4 CRYO TK SETS | - Electronic cuff checklist #1 touch screen operation degraded during EVA PGSC PL3 hard disk error message and unexplained lockups on flight deck PGSC TACAN RM fails. |
| | 2 | | OMS-2: 36:09 36:09 209.1 FPS 209.1 FPS | <u>S/T</u> : 469:20:35:03 <u>OV-103</u> : 128:19:01:34 | against corner. (| the ove Others, o | rhead clockwi ms/MS | in upper r se from him PLT Hammo | right are | RMS 37 (S.N. 201) RMS used for SPARTAN deploy, retrieve, and berth, and for SPIFEX and | - PROX OPS camera ALC logic lockup. - Side hatch locking device obstruction. - RCS jet L1A fail off. |
| | | | | DISTANCE: 4,576,174 sm | Lee/MS 8 | Linenge | er/ MS. | | | SAFER ops | |

| SPACE SHUTTLE MISSIONS SUMMARY Page 2- | | | | | | | | | | | | |
|--|----------------------|--|-----------------------------------|---|---|-----------------|-------------|----------------------------------|--------------|-------------------------------|---|--|
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | | |
| FLT | ORBITER | (6) | LAUNCH SITE, LIFTOFF TIME, | RUNWAY, CROSSRANGE | NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS | |
| NO. | URBITER | | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | FSW | PAYLOADS/ | (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, | |
| NO. | | TITLE, NAMES | ABORT TIMES | FLT DURATION. | PROFILE | ET | IIVC | 11/2/111 | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) | |
| | | & EVA'S | | WINDS | ENG. S.N. | | | | | | | |
| STS-68 | OV-105 (Flight 7) | CDR: Michael A. Baker | KSC 39 PAD A 273:11:15:59.98Z | EDW 22, CONC (EDW 42, CONC 23) | 104/104/ 109% | BI-067 | 57° (17) | DIRECT INSERTION | OI-22 (8) | <u>CARGO</u> : 34252 LBS | KSC W/D: OPF 59, VAB 20 (2), PAD 41 (2) = 120 days total. | |
| SEQ | Endeavour | (Flt 3 - STS-43 & STS-52) | 7:16:00 AM FDT (P) | 284:17:02:087 | 10970 | RSRM | (17) | INSERTION | (0) | 34232 LD3 | LAUNCH POSTPONEMENTS: | |
| FLT #65 | | P360/R133/V81/M/118 | 7:16:00 AM EDT (A) | 10:02:89 AM PDT | PREDICTED: | 40 | | POST OMS-2: 120 X 119 NM | | PAYLOAD . | - Launch date baselined as 10/27/94 on 7/9/93. | |
| KSC-65 | OMS PODS: | PLT: | Friday 12 9/30/94 (6) | Tuesday 11 10/11/94 (6) | 100/100/100/ 67/104 | ET-65 | | 120 X 119 NW | | CHARGEABLE: 27640 LBS | - Launch date advanced to 8/18/94 on 9/2/93. - Launch date postponed to 10/2/94 after pad abort #5 on | |
| | LPO4-14 | Terrence W. Wilcutt | \ ' | | | | | | | DEDLOVED | 18/18/94, moving STS-68 after STS-64. | |
| PAD 39A-40 | RPO1-20 FRC5-7 | P361/R183/M160 | LAUNCH WINDOW: 2H30M CTOB | <u>DEORBIT BURN:</u> 284:16:07:19Z | ACTUAL: 100/100/100/ | LWT 58 | | | | <u>DEPLOYED</u> : 0 LBS | - Rolled back on 8/24/94 to VAB to replace all three engines. Returned to pad on 9/13/94. | |
| 39A-40 | 111007 | <u>M/S 1</u> : | | XRANGE: 746 NM | 67/104 | <u>ET</u> | | | | | - Advanced launch date to 9/30/94 when range became | |
| MLP-1 | | Steven V. Smith P362/R184/M161 | EOM PLS: KSC TAL: ZZA | ORBIT DIR: DR 12 | 1 = 2028 (9) | PRED RPT: | | | | NON-DEPLOYED: 25997 LBS | available. | |
| | | | TAL WX: MRN, BEN | ALM DT MOMENT | 2 = 2033 (6) | 271K | | | | | LAUNCH SCRUBS/PAD ABORT #5: | |
| | | M/S 2: Daniel W. Bursch | SELECTED: | | 3 = 2026 (4) | ЕТ | | | | MIDDECK: 1643 LBS | - 8/18/94 launch scrubbed with pad abort #5 at -1.86 seconds when HPOTP turbine discharge temp A exceeded 1560 | |
| | | (Flt 2 - STS-51) | RTLS: KSC33/N/N | MLGTD: 3522 FT 284:17:02:08Z | M 3 EOM: | BKUP: | | | | | degrees R start redline limit. Rolled back to VAB and replaced all three engines. Rescheduled launch to 10/2/94 and moved | |
| | | P363/R169/V109/M147 | TAL: MRN20/N/N | IVEL: 196 KGS | WEIGHT: | 214K | | DEODDIT: | | SHUTTLE ACCUMULATED | all three engines. Rescheduled launch to 10/2/94 and moved STS-64 ahead of STS-68. | |
| | | M/S 3: | AOA: NOR17/N/N PLS: EDW22/N/N | HDOT: -2.3 FPS | 221784 LBS X CG: | ET | | <u>DEORBIT</u> : 111 X 110 NM | | WEIGHTS: | | |
| | | Peter J. K. (Jeff) Wisoff | | TD NORM 205: | 1078.7 | IMPACT | | VELOCITY | | DEPLOYED: | LAUNCH DELAYS: None | |
| | | (Flt 2 - STS-57) P364/R166/V110/M145 | <u>TDEL</u> : -0.16 -0.038/0.0 | 2589 FT | LANDING: | 1:13:26 MET | | <u>VELOCITY</u> : 25658 FPS | | 766601 LBS NON-DEPLOYED: | TAL WX: | |
| | | MIC A (DA)(I OAD ODD) | | DRAG CHUTE DEPLOY: 188 KEAS | WEIGHT: | LAT: | | | | 901229 LBS | - Zaragoza was prime but was forecast and observed NO GO for ceilings. | |
| | | M/S 4 (PAYLOAD CDR): Thomas D. Jones | MAX Q NAV: 688 690 | 284:17:02:11Z | 221673 LBS X CG: | 43.9°S LONG: | | ENTRY RANGE: | | CARGO TOTAL: 1959395 LBS | - Moron (selected) and Ben Guerir were forecast and observed | |
| - WII C | CHITY | (Flt 2 - STS-59) P365/R177/V111/M155 | CDD CTC: | NLGTD: 7299 FT | 1080.4 | 156.3°W | | 4480 NM | | | GO. | |
| BAKEN | SMITH | P303/K177/V111/IVI133 | <u>SRB STG</u> : 2:03.8 2:03 | 284:17:02:21Z VEL: 133 KGS | | | | | | PERFORMANCE MARGINS (LBS): | DOLILU/I-LOADS: | |
| | | MCC FCR-1 (44) | PERF: NOMINAL | HDOT: -5.1 FPS | | | | | | FPR: 3981 FUEL BIAS: 987 | - NOMINAL and DOLILU I-loads were GO, selected NOMINAL, no uplink required. | |
| 1000 | 17/4/19 | FLIGHT DIRECTORS: | | BRK INIT: 82 KGS | | | | | | FINAL TDDP: 1721 | ' ' | |
| WISOFF BUR | SCH JONES | A/E/O1 - R. D. Jackson LD/O 2 - C. W.Shaw | 2 ENG TAL (MRN): 2:58 2:59 | DRAG CHUTE JETTISON: 55 KGS | | | | | | RECON: 2071 | FLIGHT DURATION CHANGES: - Flight extended from 10 to 11 days for additional science. | |
| | | 0 3 - R. E. Castle | 2:38 2:39 | <u>JETTISON</u> : 55 KGS 284:17:02:45Z | | | | | | PAYLOADS: | - Waved off landing at KSC on orbit 182 due to late convection activity and forecast (and observed) 3000 ft ceiling variable | |
| | | MOD - A. L. Briscoe | NEG RETURN: 4:03 4:04 | AVE BRK DECEL: | | | | | | PLB: SPACE RADAR | broken. Waved off landing at KSC on orbit 183 due to | |
| | | | | 4.0 FPS/S | | | | | | LABORATORY | broken. Waved off landing at KSC on orbit 183 due to continuing convective activity and forecast ceiling violations and chance of rain within 30 nm. Total flight extensions - 1 day plus | |
| | | | PTA (U/S 180): | WHEELS STOP: | | | | | | (SRL-2) | one orbit. | |
| | - NO. | Marine Service | 5:56 5:49 | 284:17:03:10Z 12017 FT | | | | | | ŠIR-C/X-SAR MAPS | LANDING SITE CHANGE: | |
| | 137 | | <u>PTM</u> : | ROLLOUT: | | | 26 | 60 | | GAS (5) | LANDING SITE CHANGE: - Changed landing site to EDW due to forecast of worsening | |
| | The same of | 200 | 6:18 6:05 | 8495 FT 62 SEC | | | | | 17 | MIDDECK: | weather at KSC on Wednesday; hence, landed at EDW on orbit 183. | |
| | | | MECO CMD: | | - | | 6 | | 61 | CPCG | | |
| | | | 8:34.8 8:33.9 | WINDS: H7, L3 KTS OFFICIAL: 2208P10 | | 9 | | | | CHROMEX BRIC | SIGNIFICANT ANOMALIES: - MTU accumulator 3 lost. | |
| | A THE PARTY | | | OFFICIAL: 2208P10 H8, L1 KTS | | | 1 | | | CREAM | - FES feedline A hi load line temp read off-scale-high. | |
| | A STATE OF | The state of the s | 25 780 25775 | DENS ALT: 3912 FT | | 1 | | Y | | MAST | Rudder channel 3 slow to bypa'ss during FCS checkout. Simulation termination during DOLILU I-load verification. | |
| 20 | | | <u>OMS-2</u> : | | | 0 - | | | | E CDVO TV CETC | - Ku-Band CH3 (PL MAX) interference on channels 2 and 1. | |
| | | | 35:09.7 159 FPS | FLT DURATION: 11:05:46:08 273:46:08 | | A | | | | 5 CRYO TK SETS | - CCTV cameras B, C, and D problems. - Linhof, Hasselblad, and Nikon camera problems. | |
| | | | | | TCIVI | | | | | RMS 38 | - Degraded tracks on payload recorder. | |
| STS068-0 | 070-023 | The Space Radar | | <u>S/T</u> : 481:02:21:11 | (le le i et e le mai le manier de le mai le manier de le mai le | | | | | (S.N. 303) | - WSB 2 reg pressure increase. - WSB 1 and WSB 3 pressure decay. | |
| Laborator | ry-2 (SRL-2 |) in the Space | | <u>OV-105</u> : 66:02:45:23 | (clockwise from bottom right) Jones/PLC, CDR Baker, Bursch/l | | | | РΙΤ | RMS NOT USED PER PLAN | - RCS jet L3D fail off, low chamber pressure indication. | |
| Shuttle E | ndeavour's | cargo bay. | | DISTANCE: 4,703,000 sm | Wilcutt, Smith/MS, & Wisoff/MS. | | | | | LIXILAN | - RCS jet L5D oxidizer injector temp sensor erratic, implemented GMEM and vernier control. | |

| | | | 3P | ACE SHU | JIILE | | 310 | 149 901 | 1 age 2-70 - 010-00 | | |
|--|--|---|--|--|---|---|---------------------------------|--|---------------------|---|---|
| FLT NO. | ORBITER | CREW (6) TITLE, NAMES & EVA'S | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS | SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N. | SRB RSRM AND ET | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-66 SEQ FLT #66 KSC-66 PAD 39B-26 MLP-3 | OV-104 (Flight 13) Atlantis 15th Spacelab Flight OMS PODS: LPO3-17 RPO4-13 FRC4-13 | CDR: Donald R. McMonagle (Flt 3 - STS-39, STS-54) P366/R126/V87/M113 PLT: Curtis L. Brown (Flt 2 - STS-47) P367/R152/V112/M136 M/S 1 (PAYLOAD CDR): Ellen Ochoa (Flt 2 - STS-56) P368/R160/V113/F20 M/S 2: Joseph R. Tanner P369/R185/M162 M/S 3: Jean-Francois Clervoy P370/R186/M163 (ESA - France) M/S 4: Scott E. Parazynski P371/R187/M164 MCC FCR-1 (45) FLIGHT DIRECTORS: A/E - J. W. Bantle LD/O 2 - R. E. Castle O 1 - J. M. Heffin | 11:59:43 AM EST (A) Thursday 17 11/3/94 (9) LAUNCH WINDOW: 1H02M, Crista-SPAS Beta Req ≥ 20 deg EOM PLS: KSC TAL: ZZA TAL WX: MRN, BEN SELECTED: RTILS: KSC 33/N/N TAL: BEN 36/N/N AOA: NONE PLS: EDW 04/N/N TDEL: 0.19 0.552/0.59 MAX Q NAV: 688 691 SRB STG: | Monday 13 11/14/94 (9) DEORBIT BURN: 318:14:31:05Z XRANGE: 745 NM ORBIT DIR: AL 16 AIM PT: NOMINAL MLGTD: 3219 FT 318:15:33:45Z VEL: 195 KGS 193 KEAS HDOT: -1.3 FPS TD NORM 195: 3032 FT DRAG CHUTE DEPLOY: 183 KEAS | 104/104/ 109% PREDICTED: 100/100/100/ 67/104 ACTUAL: 100/100/100/ 68/104 | BI-069 RSRM 38 ET-67 LWT 60 ET RPT 271K ET BR/UP 214K ET IMPACT 1:14:01 MET LAT: 42.2°S LONG: 156.9°W | 57° (18) | DIRECT INSERTION POST OMS-2: 164.8 X 164.2 NM DEPLOY (SPAS): 00/19:50:06 MET 164 X 163 NM SPAS GRAPPLE: 08/20:05:35 MET 160 X 157 NM SPAS BERTH: 08/23:50:19 MET DEORBIT: 162 X 156 NM VELOCITY: 25798 FPS ENTRY RANGE: 4387 NM | (3) | CARGO: 23560 LBS PAYLOAD CHARGEABLE: 18135 LBS DEPLOYED: 0 LBS NON-DEPLOYED: 9901 LBS MIDDECK: 1080 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 766601 LBS NON-DEPLOYED: 912210 LBS CARGO TOTAL: 1982955 LBS PERFORMANCE MARGINS (LBS): FPR: 3775 FUEL BIAS: 1136 FINAL TDDP: 3284 RECON: 3158 PAYLOADS: PLB: CRISTA/SPAS (Deploy& retrieve)) | KSC W/D: OPF 110, VAB 6, PAD 24 = 140 days total. LAUNCH POSTPONEMENTS: - Launch baselined as 8/18/94 on 4/22/93 Postponed launch to 10/27/94 on 9/20/93 Postponed launch to 11/3/94 on 9/30/94 after STS-68 pad abort. LAUNCH SCRUBS: None. LAUNCH DELAYS: - Launch delayed for 3M43S while holding at T-5 min to discuss TAL weather. ZZA and MRN were NO GO due to forecast ceiling and rain. BEN was forecast NO GO for crosswinds crosswind trend was downward (last observed at 15 knots). Waiver to flight rule 4-64 was written.) TAL WX: - ZZA (prime) was forecast NO GO for ceiling, tailwind, and light rain with 5 nm. MRN was forecast NO GO for ceiling and light rain with 5 nm. BEN (selected) was forecast NO GO for crosswinds but downward trend. DOLILU/I-LOADS: - Both DOLILU and NOMINAL I-loads were GO, NOMINAL was selected with maximum load indicator at 88 percent. No uplink required. FLIGHT DURATION CHANGES: - Decision made to not try landing at KSC on orbits 174 and 175 due to forecast of gale winds, rain, and ceiling violations caused by Tropical Storm Gordon. Landed at EDW on orbit 176. Extended flight two orbits. LANDING SITE CHANGE: KSC to EDW |
| | 6-129-005 payload bay | O3 - P. L. Engelauf O4 - N. W. Hale MOD - A. L. Briscoe | MECO CMD: 8:35.9 8:34.4 VI: 25832 25826 OMS-2: | AVE BRK DECEL: 6.0 FPS/S WHEELS STOP: 318:15:34:35Z 10866 FT ROLLOUT: 7647 FT 50 SEC WINDS: T3, R3 KTS OFFICIAL: 3064 T3, R3 KTS DENS ALT: 645 FT FLT DURATION: 10:22:34:02 262:34:02 S/T: 492:00:55:13 OV-105: 83:08:27:02 DISTANCE: 4,554,791 sm | left to rig CDR Mc PLT Brow | 56-015 ht in low Monagle wn. Floa | ver rove, e, Para ating a | on Flight De v,Tanner/MS azynski/MS, | eck: S, | Atmospheric Science Experiments ATLAS-3 SSBUV-A ESCAPE-II MIDDECK: PARE/NIH-R PCG-TES PCG-STES SAMS, HPP STL/NIH-C 5 CRYO TK SETS RMS 39 (S.N. 202) RMS used for CRISTA/SPAS deploy, grapple and berth, and monitor supply and waste water dump (saw icicle form) | FIRSTS: - First use of "R-BAR" approach for rendezvous which is required to protect Mir solar arrays on Mir rendezvous flights. RENDEZVOUS #18: To retrieve and return CHRISTA-SPAS, which was deployed earlier in flight. SIGNIFICANT ANOMALIES: - Spacelab ERAU 20 skipped triplet GPS 4 MMU1 BCE 18 failure Damaged tile at overhead window (W8) FES oscillations at low heat loads FES outlet temp sensor lag Av Bay 2 Smoke Detector A concentration transients Ice formation on PLBD during simultaneous supply and waste water dump on FD8 (1.5" D X 5-6' long). Canceled icicle removal with RMS when RMS wrist camera failed. At landing, ice (approx 3"x5"x3") was seen on PLBD FES B undertemp shutdown Fuel Cell 2 H2O through alternate path Spacelab subsystem inverter shutdown NSP 2 to Ku-Band Channel 1 interface failure WSB 3 regulator pressure decay. |

| | | | JF | ACE SHU | | | | 13 301 | ALIAL | ANI | Fage 2-79 - 313-03 |
|--|--|---|--|--|--|--|---------------------------|---|-------|--|--|
| FLT NO. | ORBITER | CREW (6) TITLE, NAMES & EVA'S | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS | SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N. | SRB RSRM AND ET | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-63 SEQ FLT #67 KSC-67 PAD 39B-27 MLP-2 | OV-103 (Flight 20) Discovery Spacehab-3 OMS PODS: LP01-23 RP03-21 FRC3-20 | CDR: James D. Wetherbee (Flt 3 - STS-32, STS-52) P372/R108/V80/M97 PLT: Eileen M. Collins P373/R188/F24 M/S 1/EV2 (PAYLOAD CDR): Bernard A. Harris (Flt 2 - STS-55) P374/R162/V114/M142 M/S 2/EV1: C. Michael Foale (Flt 3 - STS-45, STS-56) P375/R143/V92/M127 M/S 3: Janice E. Voss (Flt 2 - STS-57) P376/R167/V115/F22 M/S 4: Vladimir Titov (SS Flt #1) (Flt 4 - SOYUZ T-8, SOYUZ T-10, MIR SOYUZ TM-4) P377/R189/M165 RUSSIAN COSMONAUT SS EVA #29 EMU/TETHERED EVA SCHEDULED EVA #25 EVA DEVELOPMENT FLIGHT TEST (EDFT) #1 TO DEMONSTRATE EVA PROCEDURES AND ABILITY TO MOVE LARGE OBJECTS. COLD | SELECTED: RTLS: KSC33/CI/N TAL: ZZA30/N/N AOA: KSC33/CI/N PLS: EDW04/N/N TDEL: -0.32 -0.478/0.28 MAX Q NAV: 716 723 SRB STG: 2:05.6 2:05 PERF: NOMINAL 2 ENG TAL (BEN): 2:25 2:22 NEG RETURN: | KSC 15 (KSC 22) 42:11:50:19Z 6:50:19 AM EST Saturday 12 2/11/95 (3) DEORBIT BURN: 42:10:44:04 Z XRANGE: 469 NM ORBIT DIR: DR 13 AIM PT: CLOSE IN MLGTD: 1261 FT 42:11:50:19Z VEL: 206 KGS | ENG. S.N. 104/104/ 109% PREDICTED: 100/104/97/ 69/104 ACTUAL: 100/104/94/ 69/104 1 = 2035 (1) 2 = 2109 (14) 3 = 2029 (11) M 3 EOM: WEIGHT: 212775 LBS X CG: 1079.5 LANDING: WEIGHT: 212693 LBS X CG: 1081.2 | BI-070 RSRM 42 ET-68 LWT 61 ET RPT 271K ET BR/UP 214K ET IMPACT 1:27:07 MET LAT: 0.036°S LONG: 125.6°W | (1) | DIRECT INSERTION POST OMS-2: 183.9 X 168.9 NM MIR RNDZ: Mir CPA of 37 feet at 3/13:58 MET 3/19:20Z 213.5 X 206 NM Backaway: 3/14:10 MET Flyaround Initiated: 3/14:53 MET Sep Burn: 3/15:50 MET DEORBIT: 212 X 204 NM VELOCITY: 26903 FPS ENTRY RANGE: 4329 NM | (4) | CARGO: 24903 LBS PAYLOAD CHARGEABLE: 19051 LBS DEPLOYED: 23 LBS NON-DEPLOYED: 15249 LBS MIDDECK: 1128 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 766624 LBS NON-DEPLOYED: 928587 LBS CARGO TOTAL: 2007858 LBS PERFORMANCE MARGINS (LBS): FPR: 3775 FUEL BIAS: 1136 FINAL TDDP: 1830 RECON: 3476 PAYLOADS: PLB: SPACEHAB-3 CGP/ODERACS-2 (deployed) SPARTAN-204 (deployed and retrieved) MIDDECK: SSCE AMOS | KSC W/D: OPF 71, VAB 5, PAD 25 = 101 days total. LAUNCH POSTPONEMENTS: - Launch date baselined as 5/19/94 on 1/19/93 Launch date postponed to 1/26/95 on 11/18/93 Launch date postponed to 2/2/95 on 3/25/94. LAUNCH SCRUBS: - 2/2/95 launch scrubbed at L-9 hours caused by IMU2 (HAINS) platform fail BITE during transition from STBY to OPERATE. Replaced IMU and rescheduled launch for 2/3/95. LAUNCH DELAYS: None TAL WX: - ZZA (prime and selected) and BEN were forecast and observed GO. MRN was forecast and observed NO GO for visibility (fog). DOLILU/NOMINAL I-LOADS: - Both DOLILU and NOMINAL I-loads were NO GO for Q-plane exceedance with boundary violation for engine knockdown. NOMINAL I-loads were selected because exceedance point on alpha beta envelope was bounded by a wing strut indicator which had adequate margin of safety. Waiver was written. NIGHT LAUNCH: Space Shuttle Night Launch #10. FLIGHT DURATION CHANGES: None FIRSTS: - First African-American to walk in space - Bernard Harris RENDEZVOUS #19: - Rendezvous with Mir, prox ops and flyaround with closest approach of 37 feet. RENDEZVOUS #20: - Rendezvous with SPARTAN, retrieve and berth. SPARTAN was deployed earlier in flight. EVENTS: - ODERACS deployed at 00/23:35 MET SPARTAN deployed at 4/07:05:33 MET, grapple at 6/06:11:16 MET, and berth at 6/06:48:23 MET |
| MARRIS HARRIS | +++ | | SE PTM (U/S 810): 6:57 6:57 MECO CMD: 8:30.6 8:31.9 VI: 25885 25892 OMS-2: 42:10.3 252.6 FPS | H5, R1 KTS DENS ALT: -443 FT FLT DURATION: 8:06:28:15 202:28:15 S/T: 500:07:23:28 OV-103: 137:01:29:49 | Front row Foale/MS. | (It to rt), Back ro Russia), | Harris w (It to CDR | rt), Voss/MS Wetherbee, | ck: | 4 CRYO TK SETS RMS 40 (S.N. 201) RMS used for SPARTAN deploy, retrieve, and berth and TCS maneu- vers, water dumps and EVA objectives | RADIATOR DEPLOY #16: - Port radiator deployed for approx 7 hours on FD2 for SPARTAN ops (FES INHIBIT period) Bistable HPOTP on engine 2035 limited throttle bucket to 69 percent. Continued |

| FLT | ORBITER | CREW (6) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|--------|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| CTC YS | | _ | | | | | | | | | |

515-63

Continued

MCC FCR-1 (46)

Continued. . .

FLIGHT DIRECTORS: A/E - N. W. Hale LD/O 2 - P. L. Engelauf O 1 - R. M. Kelso PLNG - P. F. Dye MOD - B. R. Stone



STS063-86-028 Collins and Titov get TIPS mail from MCC.

STS063-716-064 Freeflying SPARTAN

Continued...

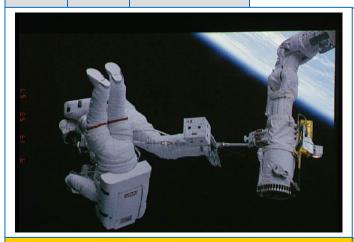
SIGNIFICANT ANOMALIES:

- Cabin pressure transducer shifted low by 0.23 PSI. Fuel Cell 2 H₂ motor status increased between 0.6 volts and 0.83 volts
- EV2 crewman experienced burning sensation in his eyes during repressurization at 5 PSI. Funny odor inside suit was
- During EVA, both EV1 and EV2 electronic cuffs were partially unresponsive.
- THC hotstick event when aft flight controller power was turned
- on (ref. STS-66), several thrusters fixed.

 TCZ Z-axis system failure during MIR backaway at 322 feet.

 Erratic TCS data sporadically throughout TCS ops on
- SPARTAN rendezvous day.
 Port radiator latch 1-6 "A" latched indication intermittent.
- Spacehab module pressure decay (air leak into airlock).
 RCS jet R1U failed off (oxidizer temp dropped below RM limit of 30 degree F), oxidizer leak.
 RCS jet L2D failed off. Jet had good driver output with
- low (< 13 PSI) chamber pressure.

 RCS jet F1F fail leak, indicated oxidizer leak.



STS063-21-011---Harris on RMS foot restraint carries Foale during shared EVA. Harris was first African-American to walk in space.



STS063-712-057 As seen from Discovery: MIR Space Station with docked Soyuz (at bottom of MIR) and Progress at opposite end.



S95-12534 -- Pat Patnesky (left) & unidentified Russian Scientist) with Shuttle mockup in background. Pat was NASA JSC PAO photographer responsible for many, many JSC MCC mission photos. He supported all NASA manned programs from Mercury through Shuttle, retirng in 1997.

| | | | 01 | ACE SH | OIILL | . 14110 | OIO | 110 001 | VIIVI | AIXI | |
|--|---|---|--|---|--|-------------|---------|-------------------------------|-------|---|---|
| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS. | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | ORBITER | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | 1300 | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-67 SEQ FLT #68 KSC-68 PAD 39A-41 MLP-1 | OV-105 (Flight 8) Endeavour Spacelab Pallet 16th Spacelab Flight EDO 5 OMS PODS: LPO4-15 RPO1-21 FRC5-8 | CDR: Stephen S. Oswald (Flt 3 - STS-42, STS-56) P378/R139/V91/M124 PLT: William G. Gregory P379/R190/M166 M/S 1: John M. Grunsfeld P380/R191/M167 M/S 2: Wendy B. Lawrence P381/R192/F25 M/S 3 (PAYLOAD CDR): Tamara E. Jernigan (Flt 3 - STS-40, STS-52) P382/R130/V83/F14 P/S 1: Samuel T. Durrance (Flt 2 - STS-35) P383/R120/V116/M108 P/S 2: Ronald A. Parise (Flt 2 - STS-35) P384/R119/V117/M107 MCC FCR-1 (47) FLIGHT DIRECTORS: A/E - R. E. Jackson O 1 - B. P. Austin O 2 - A. L. Pennington O 3 - J. P. Shannon | KSC 39A 61:06:38:12.95Z 01:37:00 AM EST (P) 01:38:13 AM EST (A) Thursday 18 3/2/95 (5) LAUNCH WINDOW: 2H30M CTOB EOM PLS: KSC TAL: BEN TAL WX: MRN SELECTED: RTLS: KSC 33/CI/N TAL: BEN 36/CI/N AOA: EDW 22/CI/N PLS: EDW 22/CI/N PLS: EDW 22/CI/N TDEL: 0.48 0.202/0.24 MAX O NAV: 728 PSF 739 PSF SRB STG: 2:06.9 2:05 PERF: NOMINAL 2 ENG TAL: 2:38 2:35 NEG RETURN: 3:59 4:01 PTA (U/S 297): 4:22 4:15 PTM (U/S 427): 5:30 5:17 SE T/M (BYD): 5:49 5:49 SE PTM (U/S-897): 6:33 6:33 MECO CMD: 8:27.65 8:27.3 | EDW 22, CONC (EDW 44, CONC 25) 77:21:47:147 1:47:14 PM PST Saturday 13 3/18/95 (5) DEORBIT BURN: 77:20:39:13Z XRANGE: 268 NM ORBIT DIR: AL17 AIM PT: NOMINAL MLGTD: 1672 FT 77:21:47:01Z VEL: 201 KGS 209 KEAS HDOT: -1.4 FPS TD NORM 195: 2980 FT NLGTD: 6240 FT 77:21:47:14Z VEL: 151 KGS | 104/104/ 109% PREDICTED: 100/104/104/ 70/104 ACTUAL: 100/104/104/ 67/104 SSME S/N: 1 = 2012 (16) 2 = 2033 (7) 3 = 2031 (12) M 3 EOM: WEIGHT: 217646 LBS X CG: 1083.5 LANDING: WEIGHT: 217437 LBS X CG: 1085.0 | ort): Jern | igan/Pl | | (5) | CARGO: 28528 LBS PAYLOAD CHARGEABLE: 20067 LBS DEPLOYED: 0 LBS NON-DEPLOYED: 18303 LBS MIDDECK: 1764 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 766624 LBS NON-DEPLOYED: 948654 LBS CARGO TOTAL: 2036386 LBS PERFORMANCE MARGINS (LBS): FFR: 3775 FUEL BIAS: 1136 FINAL TDDP: 4099 RECON: 6754 PAYLOADS: PLB: ASTRO-2 GAS-2 MIDDECK: CMIX, PGS-TCS PGS-STES SAREX-2, MACE 5 + 4 EDO CRYO TK SETS EDO PALLET RMS 41 (S.N. 303) | KSC W/D: OPF 81, VAB 5, PAD 19 = 105 days total. LAUNCH POSTPONEMENTS: - Launch date baselined as 11/3/94 on 6/24/93 - Postponed launch to 12/1/94 on 11/5/93 - Postponed launch to 12/1/95 on 3/25/94 - Postponed launch to 12/23/95 on 9/26/94 - Postponed launch to 3/2/95 on 9/26/94 - Postponed launch to 3/2/95 on 11/30/94 LAUNCH SCRUBS: None LAUNCH DELAYS: - Delayed coming out of T-9 min hold awaiting confirmation that FES feedline B heater 1 was operating after switching from heater 2 at T-18 mins. Launch delay of 1M13S. TAL WX: - Ben Guerir (prime & selected) and Moron were forecast and observed GO. Banjul was not available because of local instability. DOLILU/NOMINAL I-LOADS: - Both DOLILU and nominal were NO GO for ET load indicator ES-73 using L-1 data base. Using M data base, both were GO, DOLILU was selected because we had a better data base at MACH 1.4. An LSEAT waiver was written. NIGHT LAUNCH: Space Shuttle night launch #11. FLIGHT DURATION CHANGES/LANDING SITE CHANGE: - Waved off landing at KSC on orbits 246, 247, and 248 because of forecast ceiling violations and thunderstorms within 30 nm. Extended flight 1 day Waved off landing at KSC on orbits 262 and 263. Forecast of low ceiling and 0.2 cloud cover under 12K. Decision made to change landing site to EDW Total flight duration extension 1 day plus 1 orbit. LANDING SITE CHANGE: KSC to EDW EVENTS: - Most persons in orbit at one time, total eleven (11). Mir 18 was launched at 9:11 a.m. Moscow time (12:11 a.m. CST) on March 14 from Baikonur cosmodrome with Norm Thagard, Vladimir Dezhurov and Gennady Strekalov on board (planned return on Atlantis on STS-71). Three Russians went on Mir plus 7 Americans on Endeavor). Continued |
| | | L/O 4 - C. W. Shaw MOD - A. L. Briscoe MOD - J. W. Bantle | OMS-2: 40:19.8 40:19.8 279 FPS 279 FPS | Continued | | MS, Par | ise/PS, | v. Back (It to Durrance/PS | | RMS NOT USED | |

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|--------|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-67 | | | | Continued | | | | | | | |

Continued

STS067-713-072 ASTRO-2 cluster of telescopes and Instrument Pointing System in payload bay.

FLT DURATION: 16:15:08:48

<u>S/T</u>: 516:22:32:16 <u>OV-105</u>: 82:17:54:11

DISTANCE: 6,892,836 sm



Oswald (center), Grunsfeld STS067-368-008 (back), and Gregory (Right) involved in Middeck Experiments.

Continued . . .

SIGNIFICANT ANOMALIES:

Spacelab SCOS cache addressing error.

- FES primary A failed to come out of standby.

- Noisy supply water tank D quantity transducer.
 High N₂ flow on PCS system 2, 14.7 cabin regulator.
 Middeck audio terminal unit failure (main bus current spike).
 CCPI failure to power portable light or camcorder.
 Handheld mike was inoperative on both middeck and airlock ATU's. Possible short.
- TEAC 8 mm VCR anomaly (degraded picture quality).
 Unexplained external IPS disturbances. Pointing performance
- uegraded.

 Water spray boiler 2 excessive water usage (most of water was accidentally off-loaded prelaunch.)

 L5D oxidizer injector temperature erratic (GMEM uplinked).

 R4R jet fail leak, jet stopped leaking at 21:53 MET.



STS067-721A-087 Flying over the "Roof of the World", the Plateau of China. Himalalyan (foreground) & Gangdise Mountains.



Sts067-s-046-- Space Shuttle Program Manager (and former Flight Director), Tommy Holloway, presents STS-67 Wall Plaque to Flight Control Team for "Mission Well Done".



sts067-s-041 -- Glynn Lunney (left), VP & Program Manager USA (and former NASA Flight Director & Shuttle Porgram MGR) and Flight Director Randy Stone in MCC.

| SPACE SHUTTLE IVISSIONS SUIVIIVIART | | | | | | | | | | | |
|--|--|---|---|---|---|---|--------|---|-----|--|--|
| FLT | ORBITER | CREW (10) 7 UP, 8 DOWN | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-71 SEQ FLT #69 KSC-69 PAD 39A-42 MLP-3 | OV-104 (Flight 14) Atlantis Spacelab-Mir LM-11 17th Spacelab Flight OMS PODS: LP03-18 RP04-14 FRC4-14 | & EVA'S CDR: Robert L. (Hoot) Gibson (Fit 5 - STS-41-B, STS 61-C, STS-27, STS-47) P385/R30/V27/M29 PLT: Charles J. Precourt (Fit 2 - STS-55) P386/R161/V118/M141 M/S 1 (PAYLOAD CDR): Ellen S. Baker (Fit 3 - STS-34, STS-50) P387/R105/V75/F10 M/S 2: Gregory T. Harbaugh (Fit 3 - STS-39, STS-54 P388/R125/V88/M112 M/S 3: Bonnie J. Dunbar (Fit 4 - STS 61-A, STS-32, STS-50) P389/R79/V49/F7 MIR 19 CREW UP: MIR-19 CDR: Anatoly Y. Solovyev P390/R193/M168 MIR-19 FLIGHT ENGINEER: Nikolai Budarin P391/R194/M169 MIR-18 CREW DOWN: MIR-18 CDR: Vladimir Dezhurov P392/R195/M170 | KSC 39A 178:19:32:18:95Z 3:32:19 PM EDT (P) 3:32:19 PM EDT (A) Tuesday 9 6/27/95 (7) LAUNCH WINDOW: TOM19S Mir Planar/ Phase Window EOM PLS: KSC TAL: ZZA TAL WX: MRN, BEN SELECTED: RTLS: KSC 33/CI/N TAL: MRN 20/N/N AOA: NOR 23/N/N PLS: EDW 22/N/N TDEL: -0.13 0.192/0.23 MAX Q NAV: 708 716 SRB SEP: 2:03.7 1:59:10 PERF: NOMINAL 2 ENG TAL (MRN): 2:25 2:31 NEG RETURN: 4:04 4:05 PTA (U/S 267): 4:39 4:32 DROOP (ZZA): 5:21 5:23 PTM: 6:02 5:56 | WINDS KSC 15 (KSC 23) 188:14:54:35Z 10:54:35 AM EDT Friday 8 7/7/95 (6) DEORBIT BURN: 188:13:45:19Z XRANGE: 645 NM ORBIT DIR: AL 18 | ENG. S.N. 104/104/ 109% PREDICTED: 100/104/104/ 68/104 ACTUAL: 100/104/104/ 68/104 SSME S/N: 1 = 2028 (10) 2 = 2034 (6) 3 = 2032 (3) M.3 EOM: WEIGHT: 216527 LBS X CG: 1079.7 LANDING: WEIGHT: 216352 LBS X CG: 1081.3 | BI-072 RSRM 45 ET-70 LWT 63 ET RPT 271.3K ET BR/UP 214K ET IMPACT 1:26:57 MET LAT: 0.08°S LONG: 125.4°W | | DIRECT INSERTION POST OMS-2: 159.5 x 85.2 NM DOCKING CAPTURE: 1/17:27:57 MET HARD MATE: 1/17:35:54 MET SHUTTLE HATCH OPEN: 1/19:28:56 MET HAND SHAKE: 1/19:28:56 MET SOYOZ UNDOCKING: 6/15:32:34 MET DEORBIT: 215 X 209 NM VELOCITY: 25913 FPS ENTRY RANGE: 4321 NM | (1) | CARGO: 26577 LBS PAYLOAD CHARGEABLE: 17941 LBS DEPLOYED: 0 LBS NON-DEPLOYED: 17251 LBS MIDDECK: 690 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 766624 LBS NON-DEPLOYED: 966595 LBS CARGO TOTAL: 2062963 LBS PERFORMANCE MARGINS (LBS): FPR: 3775 FUEL BIAS: 1136 FINAL TDDP: 1040 RECON: 1398 PAYLOADS: PLB: SHUTTLE-MIR MISSION 1 SL-M/LM ODS MIDDECK: IMAX, SAREX-II | KSC W/D: OPF 115, VAB 6, PAD 44 = 165 days total. LAUNCH POSTPONEMENTS: - Baselined 5/30/95 as launch date on 10/21/93 Changed launch date to 5/24/95 on 9/1/94 Postponed launch date to NET 6/19/95 due to delays in SPECKTR launch. STS-70 was moved ahead of STS-71 Postponed launch date to NET 6/22/95 due to Mir EVA's to allow time to configure Mir docking ports and solar arrays Postponed launch date to NET 6/23/95 (docking on FD4 would be same date as 6/24/95 launch with docking on FD3). LAUNCH SCRUBS: - Scrubbed 6/23/95 launch at T-6.25 hours when tanking window ran out. Tanking violation of lightning within 5 miles Scrubbed 6/24/95 launch at L-44 mins while holding at T-9 minutes due to ceiling violations, rain, and thunderstorms in KSC area. LAUNCH DELAYS: None TAL WX: - ZZA (prime) was forecast NO GO for ceiling and thunderstorms within 20 nm. MRN (selected) and BEN were both forecast and observed GO. DOLILU/I-LOADS: - Selected and uplinked, DOLILU uplink #14, I-load uplink #20, last use of DOLILU I-load. FLIGHT DURATION CHANGES: None FIRSTS/SPECIAL EVENTS: - Lowest perigee of all space shuttle flights of 85 nm (phasing maneuver) achieved during initial orbit Smallest OMS-2 Delta V of 75.5 FPS First permanent transfer of Russian/American crews (Mir-19 up and Mir-18 crew down on Atlantis - 7 up, 8 down Carried up orbiter docking system and attached to Mir First docking of U.S. & Russian spacecraft since Apollo-Soyuz in 1975. EVENTS: - Thagard lifted off from Baikonur Cosmodrome in Kazakhstan on March 14, 1995, at 9:11:00 AM local time (73:06:11:00Z) Total Soyuz/Mir time for Thagard 107:09:57:18, total flight time 115:08:43:35 Mir/Shuttle capture at 180:13:00:14Z, docking complete at 180:13:08:18Z Crews transfer time at 180:16:08:18Z (Mir 19 from Atlantis to Mir, and Mir 18 to Atlantis), when seat liners transferred to |
| - UGA | DUNBAR COJOBLES | Continued | Continued | <u>S/T</u> : 526:12:54:31 | 1st dockir | ng betwe | en the | U.S. Space Space Station | | | - Transferred equipment, experiments, 1067 lbm H₂O, 48 lbm O₂, and 87 lbm N₂ to Mir. - Undocking completed at 185:11:09:42Z. Continued |

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M-ABORT

ROTTLE

ROFILE

MERG

| FLT | ORBITER | CREW (10) 7 UP - 8 DOWN) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SS NON E |
|--|--|--|-------------------------------|---|-----------------|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THI PF EN |
| STS-71 Conti MCC FCR-1 (FLIGHT DIRE A/E - N. W. H LD/O 1 - R. E O 2 - P. L. En PLNG - P. F. FD Moscow - Reeves MOD - A. L. E | (48) ECTORS: ale . Castle gelauf Dye W. D. | Continued MIR-18 FLIGHT ENGINEER: Gennady Strekalov P393/R196/M171 MIR-18 COSMONAUT RESEARCHER: Norman E. Thagard (Fit 5 - STS-7, STS 51-B, STS-30, STS-42) P394/R20/V14/M19 | Continued | Continued | |

KSC-95EC-0544 Spacelab-Mir module and transfer tunnel at KSC. In foreground is Obiter Docking system (ODS) topped with red Russian Androgynous Peripheral Docking System (APDS).

18-

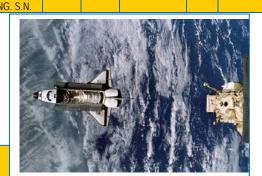
ABOVE RIGHT: NM18-309-028 -- As Atlantis approaches Mir docking node, MCC/CSR Rep James Nise reported that MIR Cosmonaut Strekalov happily yelled, "The banana truck is here!" (A reference to the days when Russia imported bannas from Cuba.)

BELOW: Soyuz photo of Shuttle docked to MIR from link:

http://io.jsc.nasa.gov/photos/10280/hires/sts07 1-s-072.jpg

Provided by Gregory A. Lange JSC-/DA8





ORBIT

HA/HP



STS071-122-013 1995 First permanent transfer of Russian/American crews (Mir-19 up and Mir-18 crew down on STS-71. Clockwise from Anatoly Y. Solovyev (at bottom center, arms folded) are Gregory J. Harbaugh, Robert L. Gibson, Charles J. Precourt, Nikolai M. Budarin, Ellen S. Baker, Bonnie J. Dunbar, Norman E. Thagard, Gennadiy M. Strekalov (angle) and Vladimir N. Dezhurov.

Continued . . .

PAYLOAD

WEIGHTS,

PAYLOADS/ EXPERIMENTS

FSW

RENDEZVOUS #21:

Rendezvous and dock with Russian Mir Space Station (first docking).

MISSION HIGHLIGHTS

(LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS,

FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

SIGNIFICANT ANOMALIES:

Postflight disassembly of RSRM nozzle joint 3 revealed RTV gas paths with slight heat effect and erosion to primary O-rings of STS-71 LH RSRM and STS-70 RH RSRM. Technique developed to remove RTV from joint and do a vacuum backfill for STS-69 and STS-73 RSRM's.

- GPC 4 annunciated GPC BITE fault message followed by GPC 4 fail. Determined to be single event upset, GPC 4 was

assigned string 4 and used successfully during entry.

- Slow docking module vestibule depress rate.

H₂ manifold valve tank 1 failed open.

- Cryo O₂ tank 1 leak through flight cap of fill/drain line QD.
- H₂ manifold valve 1 microswitch failure.
- Erratic O₂ tank 5 heater temperature.
- VHF system transmit failure.
- PDIP power fail.
- S-band comm string 2 uplink problem.
- RCS jettison R2U fail off (low chamber pressure).



s95-16417.jpg -- MOD FD, Alan Briscoe (left) leads Post-Mission toast in CSR to success of first Shuttle-MIR docking and first permanent transfer of Russian/American crews (Mir-19 up and Mir-18 crew down).

| | | | SP | ACE SH | UIILE | MI2 | 510 | NS 501 | VIIVI | ARY | Page 2-85 - STS-70 |
|---|---------------------------------|---|--|--|--|--|-------------------|---|-------|--|--|
| FLT | ORBITER | CREW (5) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-70 SEQ FLT #70 KSC-70 PAD 39B-28 MLP-2 HEN 1st fligh Block I shown i courtes: | SSME, n test, | CDR: Terence T. (Tom) Henricks (Fit 3 - STS-44, STS-55) P395/R135/V93/M120 PLT: Kevin R. Kregel P396/R197/ M172 M/S 1: Donald A. Thomas (Fit 2 - STS-65) P397/R180/V119/M158 M/S 2: Nancy J. (Sherlock) Currie (Fit 2 - STS-57) P398/R165/V120/F21 M/S 3: Mary Ellen Weber P399/R198/F26 MCC FCR-1 (49) (A/E & TDRS DEPLOY) WHITE FCR (1) (ON ORBIT OPS) FLIGHT DIRECTORS: A/E - R. D. Jackson LD/O 2 - R. M. Kelso O 1 - J. P. Shannon PLNG - B. P. Austin MDR 1 - C. W. Shaw | 9:41:55 AM EDT (A) Thursday 19 7/13/95 (4) LAUNCH WINDOW: 2H30M CTOB EOM PLS: KSC TAL: BEN TAL WX: MRN SELECTED: RTLS: KSC 15/N/N TAL: BEN 36/N/N AOA: EDW 22/N/N PLS: EDW 22/N/N TDEL: 0.0 0.12/.05 MAX Q NAV: 692 686 SRB STG: 2:02.7 2:05 PERF: NOMINAL 2 ENG TAL (BEN): NEG RETURN: 3:59 4:03 | KSC 33 (KSC 24) 203:12:02:00Z 8:02:00 AM EDT Saturday 14 7/22/95 (6) DEORBIT BURN: 203:17:00:13Z XRANGE: 430 NM ORBIT DIR: DL 33 AIM PT: NOMINAL MLGTD: 2601 FT 203:17:202:00Z VEL: 198 KGS 194 KEAS HDOT: -1.4 FPS TD NORM 195: 2400 FT DRAG CHUTE DEPLOY: 189 KEAS 203:12:02:03Z NLGTD: 5460 FT 203:12:02:03Z NLGTD: 5460 FT 203:12:02:09Z VEL: 164 KGS HDOT: -6.1 FPS BRK INIT: 89 KGS DRAG CHUTE DEPLOY: 189 KEAS 203:12:02:35Z AVE BRK DECEL: 4.6 FPS/S | 104/104/ 109% PREDICTED: 100/104/104/ 67/104 ACTUAL: 100/104/104/ 67/104 SSME S/N: 1 = 2036 (1) 2 = 2019 (15) 3 = 2017 (12) M 3 EOM: WEIGHT: 194267 LBS X CG: 1097.2 LANDING: WEIGHT: 194190 LBS X CG: 1099.1 | BI-073 RSRM 44 ET-71 LWT 64 ET RPT 271K ET BR/UP 214K ET IMPACT 1:20:13 MET LAT: 13.75°S LONG: 163°W | 28.45° (38) | DIRECT INSERTION POST OMS-2: 160.9 X 160.7 NM DEORBIT: 166 X 155 NM VELOCITY: 25789 FPS ENTRY RANGE: 4265 NM | (2) | CARGO: 46799 LBS PAYLOAD CHARGEABLE: 44445 LBS DEPLOYED: 37714 LBS NON-DEPLOYED: 5585 LBS MIDDECK: 1086 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 804398 LBS NON-DEPLOYED: 973266 LBS CARGO TOTAL: 2109762 LBS PERFORMANCE MARGINS (LBS): FPR: 3775 FUEL BIAS: 1136 FINAL TDDP: 3789 RECON: 5299 PAYLOADS: PLB: TDRS-G/IUS | KSC W/D: OPF 63, VAB 14 (2) PAD 43 (2) = 120 days total. LAUNCH POSTPONEMENTS: - Baselined launch date 6/29/95 on 3/18/94 Advanced launch date to 6/8/95 on 5/2/95, moving STS-70 ahead of STS-71. Delays on SPEKTR launch & docking with Mir caused STS-71 launch to be postponed Postponed 6/8/95 launch to 7/13/95 on 6/2/95 based on decision to rollback to VAB and repair holes (>200) in ET caused by a pair of woodpeckers (Northern Flickers). Moved STS-70 after STS-71. LAUNCH SCRUBS: None LAUNCH DELAYS: - Launch delayed 55 seconds while holding at T-31 seconds due to Range Safety ET destruct package receiver fluctuating AGC (possible multipath). TAL WX: - BEN was prime and selected. MRN was forecast and observed NO GO due to crosswinds. Banjul in plane site was down for runway repair. DOLILU/NOMINAL I-LOADS: - First planned use of DOLILU II I-loads. DOLILU II was selected and uplinked. DOLILU II uplink #1, I-load uplink #21. FLIGHT DURATION CHANGES: - Waved off landing at KSC on orbits 127 and 128 because of forecast and observed GO but marginal with potential for ground fog but observed GO at landing time Total flight extensions 1 day plus 1 orbit. |
| Hausma | y, Dan an,/P&W/ lyne/ KSC | MDR 1 - C. W. Shaw MDR 2 - J. M. Heflin MOD - B. R. Stone | PTA (U/S 244): 5:03 5:01 DROOP (BYD): 5:00 5:31 PTM (U/S): 5:46 5:47 SE TAL (BYD): 5:59 6:06 SE PTM (U/S 537): 7:01 7:01 MECO CMD: 8:30.75 8:30.7 VI: 25876 25874 OMS-2: 39:54.9 39:55 DELTA V 222 FPS | <u>OV-103:</u> 145:23:49:54 | STS070-368 With Ohio fla Thomas/MS, Weber/MS, F | ag as bad , Currie/I | ckdrop: MS, CE | Left to right, | | TDRS-G/IUS (DEPLOYED) MIDDECK: PARE/NIH-R, BDS, CPCG, STL/NIH-C, BRIC(2), SAREX-II, VFT-4, HERCULES, MIS-B, MSX, MAST, WINDEX, RME-III 4 CRYO TK SETS NO RMS | - Total flight extensions 1 day plus 1 orbit. FIRSTS: - First flight to be controlled by White FCR in new MCC (Bldg 30S) for most of orbit operations. Ascent and entry plus early and late orbit ops being controlled from old MCC FCR-1 First flight with Block I SSME (2036). SIGNIFICANT ANOMALIES: - Postflight disassembly of RSRM nozzle joint 3 revealed gas paths with slight heat effect and corrosion to primary o-ring of |

| | | | SP | ACE SHU |) LE | MIS | | NS SUN | | ARY | Page 2-86 - STS-69 |
|------------------------|--------------------------|---|--|---|--------------------------------|--------------------|--------|--|---------|-------------------------------------|---|
| | | CREW | LAUNCH SITE. | LANDING SITE/ RUNWAY, | SSME-TL NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (5) | LIFTOFF TIME. | CROSSRANGE | EMERG | RSRM | | ORBIT | FSW | WEIGHTS. | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-69 | OV-105 | CDR: | KSC 39A | WINDS KSC 33 (KSC 25) | ENG. S.N. 104/104/ | BI-074 | 28.45° | DIRECT | OI-24 | CARGO: | KSC W/D: OPF 81, VAB 7 PAD 47 (2) = 135 days total. |
| | (Flight 9) | David M. Walker | 250:15:08:59.96Z | 261:11:37:55Z | 109% | DODIA | (39) | INSERTION | (3) | 31549 LBS | LAUNCH POSTPONEMENTS: |
| SEQ FLT #71 | Endeavour | (Flt 4 - STS 51-A, STS-30, STS-53) | 11:09:00 AM EDT (P) 11:09:00 AM EDT (A) | 7:37:55 AM EDT | PREDICTED: | RSRM 48 KM | | POST OMS-2: | | PAYLOAD | - Baselined launch date of 3/16/95 on 11/18/93. |
| | | P400/R48/V40/M45 | Thursday 20 | Monday 14 | 100/104/104/ | | | 201 x 199 NM | | CHARGEABLE: | - Postponed launch date to 5/4/95 on 3/24/94. - Postponed launch date to 7/20/95 on 10/6/94. |
| KSC-71 | OMS PODS: | PLT: | 9/7/95 (7) | 9/18/95 (8) | 67/104 | ET-72 | | DEORBIT: | | 25346 LBS | - Postponed launch date to 8/5/95 caused by delays in STS-71 |
| PAD | LPO4 - 16 | Kenneth D. Cockrell (Flt 2 - STS-56) | LAUNCH WINDOW: | <u>DEORBIT BURN:</u> 261:10:35:13Z | ACTUAL: | LWT | | 186 x 181 NM | | DEPLOYED: | and STS-70. |
| 39A-43 | RPO5 - 7 FRC5 - 9 | P401/R159/V121/M140 | 2H30M CTOB | XRANGE: 202 NM | 100/104/104/ 67/104 | 65 | | VELOCITY: | | 0 LBS | - Postponed launch date to 8/31/95 while program analyzed RTV gas paths in nozzle joint #3 on STS-71 and STS-70, then |
| MLP-1 | 7 | M/S 1 (PAYLOAD CDR): | EOM PLS: KSC | ORBIT DIR: DL 34 | | ET | | VELOCITY: 25839 FPS | | NON-DEPLOYED: | developed a fix for STS-69 Rolled back to VAB on 8/1/95 under threat of Hurricane Erin. |
| | | James S. Voss | TAL: BEN TAL WX: MRN | | 1 = 2035 (2) 2 = 2109 (16) | <u>RPT</u> 271K | | FNTRY | | 16739 LBS | - Returned to pad on 8/8/95. |
| | | (Flt 3 - STS-44, STS-53) P402/R136/V85/M121 | | AIM PT: CLOSE IN | 2 = 2109 (16) 3 = 2029 (12) | | | ENTRY RANGE: | | MIDDECK: 1301 LBS | LAUNCH SCRUBS: |
| | WALKER | M/S 2/EV-1: | RTLS: KSC 15/CI/N | MLGTD: 1912 FT 261:11:37:55Z VEL: 218 KGS | M 3 EOM: | BR/UP | | 4332 NM | | 1301 LBS | - Scrubbed 8/31/95 launch at approx. L-7.5 hours when fuel cell 2 |
| WEWN | | James H. Newman | TAL: BEN 36/N/N AOA: EDW 22/N/N | VEL: 218 KGS | WEIGHT: | 214K | | · 714-042-Voss | (top) | SHUTTLE | condenser exit temperature exceeded LCC limit of 160 deg F Rescheduled launch for 9/7/95. |
| E | | (Flt 2 - STS-51) P403/R168/V122/M146 | PLS: EDW 22/N/N | 212 KEAS HDOT: -4 FPS | 219395 LBS X CG: | FT | & Gern | hardt EVA | | ACCUMULATED WEIGHTS: | LAUNCH DELAYS: None |
| MANAGE | V015 | | TDEL: | TD NORM 205: | 1080.7 | <u>IMPACT</u> | | | | DEPLOYED: | |
| | | M/S 3/EV-2: Michael L. Gernhardt | 0.0 0.032/-0.09 | 2468 F I | LANDING: | 1:24:54 MET | | | | 804398 LBS NON-DEPLOYED: | TAL WX: - BEN (prime and selected), MRN forecast NO GO for ceiling |
| | | P404/R199/M173 | MAX Q NAV: | DRAG CHUTE DEPLOY: 187 KEAS | WEIGHT: | LAT: | A | 1000 | | 991306 LBS | and rain but observed GO 10 mins prior to landing time. |
| MCC FCF | R-1 (50) (A/E) CR (2) | SS EVA #30 | 705 PSF 715 PSF | 261:11:38:03Z | 219298 LBS X CG: | 18.8°S LONG: | | 10 | · North | CARGO TOTAL: 2141311 LBS | DOLILU II/NOMINAL I-LOADS: |
| (ORBIT) | | EMU/Tethered EVA Scheduled EVA #26 | SRB SEP: | NLGTD: 6325 FT | 1082.3 | 151.9°W | 1 | | | | - Nominal I-loads were not certified for September. DOLILU-II I-loads uplinked. DOLILU-II uplink #2, total DOLILU uplink |
| FLIGHT D A/E - N. W | IRECTORS: | EVA flight test (EDFT) #2 to | 2:03.7 1:59.1 | 261:11: 38:08Z VEL: 167 KGS | | | C | | Russ | PERFORMANCE MARGINS (LBS): | #16 I-load uplink #22. |
| LD/O 1 | . W. Bantle | evaluate space suit mods to protect space walkers from | PERF: NOMINAL | HDOT: -6.5 FPS | | | 3 | 40 | | FPR: 3775 | FLIGHT DURATION CHANGES: None |
| 0 2 - P. F PLNG - G | . Dye | the cold of space, including | 2 ENG TAL (BEN): | BRK INIT: 97 KGS | | | | | 13.50 | FUEL BIAS: 1136 FINAL TDDP: 5409 | EVENTS: |
| Penningto | | heated gloves & LCVG leg bypass) PET 6H46M11S | 2:40 2:49 | DRAG CHUTE | | | t. 🦪 | | | RECON: 7966 | - SPARTAN released 1:00:38:59, grapple 2:23:53, latched |
| MOD - Ā. | L. Briscoe | Dypass) PET 0040WITTS. | NEG RETURN: 4:01 4:02 | <u>JETTISON: 62</u> KGS 261:11:38:36Z | | | | 3 7 | | PAYLOADS: | 3:00:03 MET. - WSF released 3:20:16:15, grapple 6:22:50:11 MET. |
| | | | | AVE BRK DECEL: | | The same | | - 1 | 1 | PLB: | · · · |
| | - | - | <u>PTA (U/S 328)</u> : 4:18 4:14 | 5.6 FPS/S | | A DE | - | | P | WSF (Wakeshield Facility), IFH | RENDEZVOUS #22: - Rendezvous, grapple & berth WSF. |
| | - | | DROOP (BYD): | WHEELS STOP: | n/an | | | A CONTRACTOR | | Facility), IEH, Spartan-201-03 | |
| | | 111 | 5:28 5:30 | 261:11:38:55Z 12142 FT | | | 70 | | | CAPL-II/GBA | RENDEZVOUS #23: - Rendezvous, grapple & berth SPARTAN 201-03. |
| THE REAL PROPERTY. | | | PTM (U/S 328): | ROLLOUT: | | | | | | MIDDECK: | . 3 11 |
| | FREE TO S | | 5:24 5:24 | 10230 FT 60 SEC | | | 9 | 0 | | STL/NIH-C CGBA, BRIC, | SIGNIFICANT ANOMALIES: - CRT 1 dim display. |
| 1000 | | | SE TAL (BYD): | | | 88 | 5 | J. J. | | EPICS | Fuel cell 2 condenser exit temp high (scrubbed launch attempt). Waste dumpline blockage. IFM to bypass dump filter was |
| IDPF | | | 5:51 5:52 | WINDS: T2, L4 KTS OFFICIAL: | | NO. | | A STATE OF THE STA | | CMIX | unsuccessful, so off loaded waste tank into CWC. |
| | | | LAST TAL (BEN): | 2205P06, T2, L5 KTS | | | | | | 5 CRYO TK SETS | - EVA power tool failed. |
| | -1-2 | | 6:28 | i i | | 9 | | | 16 | RMS 42 | Portable foot restraint fit problem. S-band preamp 2 degraded causing intermittent forward link. |
| | 1 | | MECO CMD: 8:30.2 8:30.2 | DENS ALT: 1315 FT | The same | | | | | (S.N. 303) | - S-band preamp 2 degraded causing intermittent forward link Middeck speaker ATU failure. |
| 3 1 L | A | 1 manual 1 | | FLT DURATION: | 1 | | | | | RMS USED TO | - Camcorder tape eject failure. - Camera D downlink lost. |
| | | | MECO VI: | 10:20:28:55 | | | | | | DEPLOY AND | - Loss of Ku-band forward link. |

S95-07799 -- FD's team in MCC. FD Al Pennington (left front) & CAPCOM David Wolf shaking hands.

41:43 OV-105: 93:14:23:06 41:43 293.4 FPS 293.4 FPS

25940

MECO VI: 25946

DISTANCE: 4,500,000 sm

S/T: 546:12:43:31

STS069-715-050 Crew in middeck: Front (It to rt) PLT Cockrell and CDR Walker. Backrow: (It to rt) Voss/MS/PLC, Gearhardt/MS, and Newman/MS.

- Camcorder tape eject failure Camera D downlink lost.

SPARTAN AND

FOR EVA AND

WSF. SUPPORT

RETRIEVE

CLAWS.

- Loss of Ku-band forward link.
- Random ops recorder commands issued when panel brightness control adjusted in new MCC.
 Hydraulics pump 3 stuck in norm press (cycled switch twice to get response then started APU
 WSB 3 lub oil overcooling during entry.

| | | | O. | ACE SHU | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | WIIO | | 140 001 | VIIVI | AITI | 1 age 3-07 - 313-73 |
|-----------------------------|--|--|---|---|--|--|---------------------------|---|-----------|--|---|
| FLT NO. | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES | SSME-TL NOM-ABORT EMERG THROTTLE | SRB RSRM AND | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, |
| NO. | | TITLE, NAMES & EVA'S | ABORT TIMES | FLT DURATION, WINDS | PROFILE ENG. S.N. | ET | IIVC | TIPVITE | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-73 SEQ FLT #72 KSC-72 | OV-102 (Flight 18) Columbia 18th Spacelab Flight | CDR: Kenneth D. Bowersox (Fit 3 - STS-50, STS-61) P405/R146/V97/M130 PLT: Kent V. Rominger P406/R200/M174 | KSC 39 PAD B 293:13:52:59.98Z 9:53:00 AM EDT (P) 9:53:00 AM EDT (A) Friday 14 10/20/95 (8) | KSC 33, (KSC 26) 309:11:45:21Z 7:45:21 AM EDT Sunday 10 11/5/95 (10) | 104/104/ 109% PREDICTED: 100/104/104/ 67/104 | BI-075 RSRM 50 ET-73 | 39.0° (4) | DIRECT INSERTION POST OMS-2: 151 X 147 NM | OI-24 | CARGO: 33705 LBS PAYLOAD CHARGEABLE: 25310 LBS | KSC W/D: OPF 100, VAB 7, PAD 48 = 155 days total. LAUNCH POSTPONEMENTS: - Baselined 9/24/95 as launch date on 6/30/94 Postponed launch to 9/28/95 on 9/8/95 caused by delay to STS-69 launch (RSRM nozzle joint #3 repairs). |
| PAD - 39B - 29 MLP-3 | LM-12 EDO 6 OMS PODS: | M/S 1: Catherine G. Coleman P407/R201/F27 M/S 2: Michael E. Lopez-Alegria P408/R202/M175 M/S 3/Payload CDR: Kathryn C. Thornton (Flt 4 - STS-33, STS-49, STS-61) P409/R107/V73/F11 | TAL: BEN 36/N/N | DEORBIT BURN: 309:10:46:40Z XRANGE: 231 NM ORBIT DIR: DR 14 AIM PT: CLOSE IN MLGTD: 2500 FT 309:11:45:21Z VEL: 214 KGS 212 KEAS | 1 = 2037 (1) 2 = 2031 (3) 3 = 2038 (1) M 3 EOM: | LWT 67 ET RPT 271K ET BR/UP 214K | | DEORBIT: | | MIDDECK: 2008 LBS | LAUNCH SCRUBS: - Scrubbed 9/28/95 launch at L-5:40 hrs when engine #1 main fuel valve leaked hydrogen. Rescheduled launch for 10/5/95 Scrubbed 10/5/95 launch prior to L-1 day MMT due to forecast of high winds and rain under influence of Hurricane Opal, rescheduled launch for 10/6/95 Scrubbed 10/6/95 launch at L-6:35 hrs while holding up tanking due to failure to service hydraulic sys 1 NLG section when MFV was replaced. Rescheduled launch for 10/7/95 Scrubbed 10/7/95 launch while holding at T-20 minutes due to MEC 1, CORE B failure. Rescheduled launch for 10/14/95 Scrubbed 10/14/95 launch at L-1 day MMT to measure high pressure oxidizer duct weld after test stand duct failure caused |
| THOMATON PARTY | MOS ADMOCED WHAT TO SEE THE SE | P/S 1: Fred Leslie P410/R203/M176 P/S 2: Al Sacco, Jr. P411/R204/M177 MCC FCR-1 (51) (ASCENT/ENTRY) WHITE FCR (3) (ORBIT OPS) | PLS: EDW 04/N/N TDEL: 0.00 -0.078/-0.04 MAX Q NAV: 708 713 SRB STG: 2:04.5 2:04 | HDOT: -1.7 FPS TD NORM 205: 3079 FT DRAG CHUTE DEPLOY: 187 KEAS 309:11:45:29Z NLGTD: 7098 FT 309:11:45:29Z VEL: 157 KGS HDOT: -5.7 FPS | X CG: 1080.7 | ET IMPACT 1:24:50 MET LAT: 2.8°S LONG: 138.97°W | | 140 x 136 NM VELOCITY: 25744 FPS ENTRY RANGE: 4519 NM | | NON-DEPLOYED: 1016616 LBS CARGO TOTAL: 2175016 LBS PERFORMANCE MARGINS (LBS): FPR: 3775 FUEL BIAS: 1136 | an oxidizer leak. Rescheduled launch for 10/15/95 Scrubbed 10/15/95 launch while holding at T-5 mins. due to forecast and observed range and RTLS NO GO for ceiling (launch window extended to 3H49M (BEN dark). LAUNCH DELAYS: - Launch delayed 3M0S while holding at T-5 mins. due to R/S command problem. TAL WX: |
| Crew this scie module | 3-736-018 worked in ence in PLB, nere flying | FLIGHT DIRECTORS: A/E - R. D. Jackson O 1 - B. P. Austin LD/O 2 - G. A. Pennington O 3 - J. P. Shannon O 4 - R. M. Kelso MOD - A. L. Briscoe | PERF: NOMINAL 2 ENG TAL (BEN): 2:48 2:47 NEG RETURN: 3:59 4:02 PTA (U/S): 5:29 5:19 DROOP (109): | BRK INIT: 125 KGS DRAG CHUTE JETTISON: 50 KGS 309:11:45:58Z AVE BRK DECEL: 6.0 FPS/S WHEELS STOP: 309:11:106:17Z 11532 FT ROLLOUT: | | | | | | FINAL TDDP: 1906 RECON: 4902 PAYLOADS: PLB: U.S. MICROGRAVITY LABORATORY (USML-2) FLUIDS PHYSICS, MATERIALS SCIENCE, | - BEN (prime & selected) with MRN and ZZA forecast and observed GO. DOLILU-II/NOMINAL I-LOADS: Both GO - DOLILU-II selected and uplinked . DOLILU-II uplink #3, DOLILU uplink #17, total uplink #23. FLIGHT DURATION CHANGES: None FIRSTS: - First flight with 2 block I SSME's (S/N 2037 & 2038). |
| | | | MECO CMD: 8:29.5 8:29.7 | 9032 FT 71 SEC WINDS: H3, R4 KTS OFFICIAL: 0305P07, H2,R4 KTS DENS ALT: 206 FT FLT DURATION: 15:21:52:21 381:52:21 S/T: 562:10:35:52 OV-102: 167:08:37:14 | STS073-3 module: Alegria/M3 from him, | Front (ar S. Others Thornto , PLT Ro | ms folds, count n/PLC, | ortrait in sciended), Lopez- ter clockwise Coleman/Ms r, Leslie PS, de | nce S, | SCIENCE, AND COMBUSTION SCIENCE OARE MIDDECK: 5 + 4 EDO CRYO TANK SETS EDO PALLET NO RMS | SIGNIFICANT ANOMALIES: - CRT-2 display flickered (IFM to replace with ORT-4). - FES feedline A mid 2 thermostat/heater failure. - FCL 1 P/L head exchanger flow degraded. - FC 3 cell performance monitor failed. - H ₂ manifold valve tank 1 failed open. - S-band lower right quad antenna degraded. - Spacelab high rate dump data bad. - APU 1 fuel pump inlet pressure decrease. - F1F jet failed off, chamber pressure deceased. - R5D and R5R transient fail off. - TDRSS STGT failure. |

| | | | SP | ACE SHU | II I L E | MISS | | 15 SUN | | ARY | Page 2-88 - \$15-74 |
|--|-----------------------|--|--|---|-------------------------------|-----------------------------------|-----------|--|-------|-----------------------------------|--|
| | | CREW | LAUNCH SITE, | LANDING SITE/ RUNWAY, | SSME-TL NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (5) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | ORBIT | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, WINDS | PROFILE ENG. S.N. | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-74 | OV-104 (Flight 15) | CDR: | KSC 39A 316:12:30:42.98Z | KSC 33 (KSC 27) 324:17:01:27Z 12:01:29 PM EST | 104/104/109% | BI-076 | 51.65° | DIRECT INSERTION | OI-24 | <u>CARGO</u> : 23687 LBS | KSC W/D: OPF 76, VAB 8 PAD 23 = 107 days total. |
| SEQ | Atlantis | Kenneth D. Cameron (Flt 3 - STS-37, STS-56) | 7:30:43 AM EST (P) 7:30:43 AM EST (A) | 12:01:29 PM EST | PREDICTED: | RSRM | (3) | | (4) | | LAUNCH POSTPONEMENTS: |
| FLT #73 | | P412/R121/V90/M109 | 7:30:43 AM EST (A) Sunday 8 | Monday 15 11/20/95 (11) | 100/104/104/ 67/104 | 51 | | POST OMS-2: 162 X 162 NM | | <u>PAYLOAD</u> CHARGEABLE: | - Baselined launch date of 10/26/95 on 5/5/94. - Postponed launch date to 11/2/95 on 9/8/95, caused by SRB |
| KSC-73 | OMS PODS: | PLT: | 11/12/95 (10) | | | ET-74 | | 102 X 102 IVIVI | | 14064 LBS | nozzle joints #3 and #4 repairs to STS-69, STS-73, and STS-74. - Advanced launch date to 11/1/95 on 10/4/95. |
| PAD- 39A-44 | LPO3-19 RPO4-15 | James D. Halsell (Flt 2 - STS-65) | LAUNCH WINDOW: | DEORBIT BURN: 324:15:53:49Z | ACTUAL: 100/104/104/ | LWT-67 | | | | DEBI OAED. | - Advanced launch date to 11/1/95 on 10/4/95. - Postponed date to 11/16/95 on 10/27/95 caused by STS-73 |
| PAD- 39A-44 | FRC4-15 | P413/R178/V123/M156 | 7 minutes | XRANGE: 612 NM | 67/104 | 2001 07 | | | | DEPLOYED: 10015 LBS | launch scrubs. |
| MLP-2 | | M/S 1: | MIR PLANAR/ PHASE WINDOW | ORBIT DIR: DR 15 | SSME S/N: | ET | | | | NON-DEPLOYED: | LAUNCH SCRUBS: |
| WILL Z | | Chris Hadfield (Canada) | EOM PLS: KSC TAL: ZZA | AIM PT: NOMINAL | 1 = 2012 (17) 2 = 2026 (5) | <u>ET</u> <u>RPT</u> 273.1K | | | | 3135 LBS | LAUNCH SCRUBS: - Scrubbed 11/11/95 launch at T-4 minutes while holding at T-5 mins, when all 3 TAL sites (BEN, MRN, ZZA) were forecast and |
| | | P414/R205/M178 | TAL WX: MRN, BEN | MLGTD: 2471 FT | 3 = 2020 (3) 3 = 2032 (4) | | | | | MIDDECK: 914 LBS | observed NO GO for weather. |
| ELL CA | MERON | <u>M/S 2</u> : | SELECTED: | 324:17:01:27Z VEL: 196 KGS 201 KEAS HDOT: -1.4 FPS | | <u>ET</u> BR/UP | | | | 914 LBS | LAUNCH DELAYS: None |
| A STATE OF THE PROPERTY OF THE | 70 | Jerry L. Ross | SELECTED: RTLS: KSC 33/CI/N | 201 KEAS | M 3 EOM: | 214K | | | | SHUTTLE | |
| Œ V | 8 | (Flt 5 - STS 61-B, STS-27, STS-37, STS-55) | AOA: KSC 33/CI/N | TD NORM 195: | WEIGHT: 202767 LBS | <u>ET</u> | | DEORBIT: | | ACCUMULATED WEIGHTS: | TAL WX: - ZZA (prime & selected) was forecast GO but observed NO GO |
| E E | E E | P415/R89/V38/M80 | PLS: EDW 22/N/N | 2955 FT | X CG: 1078.7 | IMPACT 1:26:05 | | 185 x 184 NM | | DEPLOYED: 814413 LBS | for 7000' broken ceiling. MRN forecast and observed TO. BEN forecast observed NO GO for ceilings and crosswinds. |
| ATLANTIS | | <u>M/S 3:</u> | TDEL: 0.04 0.122/0.16 | DRAG CHUTE DEPLOY: 180 KEAS | | MET | | VELOCITY: 25840 FPS | | NON-DEPLOYED: | · · |
| | | William McArthur (Flt 2 - STS-58) | | 324:17:01:33Z | <u>Landing</u> : Weight: | <u>LAT</u> : 0.31°S | | 25840 FPS | | 1020665 LBS CARGO TOTAL: | DOLILU-II I-LOADS: - Selected and uplinked DOLILU-II I-loads, DOLILU-II uplink |
| | | P416/R172/V124/M150 | MAX Q NAV: 711 PSF 711 PSF | NLGTD: 5565 FT | 202718 LBS X CG: | <u>LONG:</u> 125.6°W | | ENTRY RANGE: | | 2198703 LBS | #4, DOLILU uplink #18, I-load uplink #23. (Last flight with nominal I-load availability.) |
| | | MCC FCR-1 (52) | SRB STG: | NLGTD: 5565 FT 324:17:01:37Z VEL: 156 KGS HDOT: -6.7 FPS | 1080.6 | 123.0 W | | 4346 NM | | PERFORMANCE | • |
| | | Ascent/Entry | PERF: NOMINAL | BRK INIT: 72 KGS | | | | | | MARGINS (LBS): FPR: 3775 | FLIGHT DURATION CHANGES: None |
| | | WHITE FCR (3) | | 324:17:02:00Z | | | | | | FUEL BIAS: 1136 | RENDEZVOUS #24: |
| | | (Orbit Ops) | 2 ENG TAL (MRN): 2:22 2:22 | DRAG CHUTE JETTISON: 55 KGS | | | | -1 | | FINAL TDDP: 1823 RECON: 3689 | Rendezvous and dock with Russian Mir space station (second docking). |
| | | FLIGHT DIRECTORS: A/E - N. W. Hale | NEG RETURN: | 324:17:02:07Z | | - | | | | PAYLOADS: | EVENTS: |
| | | LD/O 1 - W. D. Reeves | 4:06 4:08 | AVE BRK DECEL: 5.0 FPS/S | | | | | 4 | PLB: | - Docking module unberth 1/18:01, capture 1/18:46:12, |
| Sts074-7 Mir as se | | | PTA (U/S 255): | WHEELS STOP: | Bell | | | TO SERVICE SER | | SHUTTLE/MIR MISSION 2 | hardmate 1/18:53:41. - Docking module APDS-1 to Mir docking at 2/17:56:57 MET, |
| Atlantis. | sen nom | MOD - R. E. Castle | 4:22 | 324:17:02:25Z | | 29 | | | | ICBC, GPP ORBITER DOCKING | hardmate at 2/18/05:05 MET. - Transferred 993 lbm H ₂ O, 59 lbm O ₂ , and 44 lbm N ₂ to Mir. |
| | | | <u>DROOP (ZZA)</u> : 5:24 5:26 | 11078 FT ROLLOUT: | 4 | and the | | V 99 > | | SYSTEM | - Manuferred 993 ibin 620, 39 ibin 62, and 44 ibin 62 to Mil. - Undocking from Mir at 5/19:45:01 MET. |
| | | | PTM (U/S 255): | 8607 FT | | | A Company | , . | d | DOCKING MODULE | RADIATOR DEPLOY #17: |
| | | | 6:04 6:03 | 58 SEC WINDS: | | | | | | MIDDECK: | - Deployed radiator to make water available for transfer to Mir. |
| | | | SE TAG (ZZA): | H6, R4 KTS OFFICIAL: 0107P10 | 311 | A | 7 | | | SAREX-II | - Port RAD deployed to make water 83:23:14 GMT. |
| - | 1 | | 5:56 5:56 | H5, R4 | 141 | 1 | | | 1 | 5 CRYO TK SETS | SIGNIFICANT ANOMALIES: - Fuel cell 3 cell performance monitor delta volt measurements |
| and the same | | | SE PTM (U/S 842): 7:00 6:54 | DENS ALT: 670 FT | | | | | | RMS 43 | for all 3 substacks shifted approximately 5 millivolts. |
| | 176 | | MECO CMD: | FLT DURATION: | | | | | | (S.N. 301) | - Cryo O ₂ manifold tank 1 valve failed open. - PLB aft port and aft starboard lights failed. |
| media. | | 1000 | 8:33.7 8:33.2 | 8:04:30:44 196:30:44 | | | -0 | | | RMS used for docking module | - H ₂ manifold valve 1 microswitch failure. - TCS 1 lost calibration, TCS 2 self-test failures. |
| 22 | 14 | | <u>VI</u> : 25878 25870 | <u>S/T</u> : 570:15:06:36 | STS074-3 | 18-005 | Crew in | Docking Modu | ıle | installation on Mir | - ODS stowage bag adapter plate jammed OPS-1 recorder track 8 data degradation. |
| | No. | | | OV-104 TOTAL: | delivered t | o Mir: Ho | lding ca | mera at bottom | 1 | and monitor plume impingement. | OPS-1 recorder track 8 data degradation. Mir camcorder battery low capacity. |
| | Very Comment | | OMS-2: 41:50 41:51.9 | 101:08:20:01 | | | | kwise from him loss/MS, and | 1. | L3 | - WSB 2 regulator pressure erratic postlanding. |
| | Special of | | 212 FPS 212 FPS | DISTANCE: 3,400,000 sm | CDR Cam | | | , aa | | | |
| | | | 1 | 0, 100,000 3111 | | | | | | I. | |

| | | | 3P | ACE SHU | IIILE I | | | 12 20 M | I IVI <i>F</i> | AR Y | Page 2-09 - 313-72 |
|----------------------------|--|--|--|--|-------------------------------|-------------------------|--------------------|----------------------------------|----------------|-----------------------------------|--|
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
| | | (6) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (1) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | INIC | LIA/LID | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, | THROTTLE PROFILE | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ADURT TIMES | WINDS | ENG. S.N. | EI | | | | EXPERIIVIENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-72 | OV-105 | CDR: | KSC 39B | WINDS KSC 15 (KSC 28) 20:07:41:40Z 2:41:40 AM EST | 104/104/ | BI-077 | 28.45° | DIRECT | OI-24 | CARGO: | KSC W/D: OPF 64, VAB 5, PAD 21 = 90 days total. |
| | (Flight 10) | Brian Duffy | 11:09:40:59:98Z | 20:07:41:40Z | 109% | | (40) | INSERTION | (5) | 21018 LBS | <u> </u> |
| SEQ FLT #74 | Endeavor | (Flt 3 - STS-45, STS-57) P417/R142/V94/M126 | 4:18:00 AM EST (P) 4:41:00 AM EST (A) | | PREDICTED: | RSRM 52 | | DOST OMS 2: | | PAYLOAD | LAUNCH POSTPONEMENTS: - Baselined launch date of 8/24/95 on 6/6/94. |
| FLI #/4 | | | Thursday 21 | Saturday 15 1/20/96 (6) | 100/104/104/ | 32 | | POST OMS-2: 248 x 94.9 NM | | CHARGEABLE: | - Postponed launch date to 11/30/95 on 10/6/94. |
| KSC-74 | | PLT: | 1/11/96 (7) | | 67/104 | ET-75 | | | | 14087 LBS | - Postponed launch date to 1/11/96 on 9/8/95. |
| | OMS PODS: LPO4 - 17 | Brent W. Jett, Jr. P418/R206/M179 | L ALINICITIVINIDOM. | <u>DEORBIT BURN</u> : 20:06:41:23Z | ACTUAL: | LWT-68 | | SFU GRAPPLE 2:01:16:19 MET | | DEPLOYED: | LAUNCH SCRUBS: None |
| PAD-39B-30 | RPO5 - 8 | | LAUNCH WINDOW: 49M33S | | 100/104/104/ | LVV I -08 | | 256.8 x 251 NM | | 0 LBS | |
| | FRC5 - 10 | M/S 1/EV 1: Leroy Chiao | SFU PLANAR/ | XRANGE: 220 NM | 67/104 | | | | | NON-DEPLOYED: | LAUNCH DELAYS: - 23 minute launch delay while holding at T-5 minutes due to |
| MLP-1 | | (Flt 2 - STS-65) | PHASE WINDOW | ORBIT DIR: DL 35 | 1 2020 (11) | ET_ | | ORBIT ADJ: | | 10546 LBS | MCC old front end processor and associated problems. 100% |
| | | P419/R179/V125/M157 | EOM PLS: KSC | <u>AIM PT</u> : NOMINAL | 1 = 2028 (11) 2 = 2039 (1) | <u>RPT</u> 271.3K | | 2:04:56:13 MET 254.7 x 164.9 | | MIDDECK: | CPU caused by not loading a necessary S/W patch. |
| | | M/S 2/EV 3: | | | 3 = 2036 (2) | 271.510 | | NM | | MIDDECK: 898 LBS | TAL WX: |
| | | Winston E. Scott | TAL WX: NONE | MLGTD: 3386 FT 20:07:41:40Z VEL: 193 KGS 185 KEAS | | <u>ET</u> BR/UP | | 015011115 | | <u>SHUTTLE</u> | - No TAL site available but no TAL site required (29 seconds |
| | | P420/R207/M180 | SELECTED: | VEL: 193 KGS | M 3 EOM: WEIGHT: | <u>BR/UP</u> 214K | | CIRC MNVR: 2:05:43:29 MET | | ACCUMULATED | overlap between RTLS and AOA). BEN was manned but NO GO for ceiling. |
| CEY | | M/S 3: | RTLS: KSC 15/N/N | HDOT: -1.7 FPS | 218496 LBS | 214K | | 165.2 X 164.7 | | WEIGHTS: | GO for ceiling. |
| OUT. | The state of the s | Koichi Wakata | TAL: BEN 36/N/N | | X CG: | ET IMPACT | | NM | | DEPLOYED: 814413 LBS | NIGHT LAUNCH: #12 |
| 3 10 3 | 1000 | (Japan) P421/R208/M181 | AOA: EDW 04/CI/N PLS:EDW 04/CI/N | <u>TD NORM 195</u> : 2768 FT | 1081.7 | 1:27:10 | | OAST REL: | | NON-DEPLOYED: | NIGHT LANDING: #8 |
| | 1 | | PLS.EDW 04/CI/N | DRAG CHUTE | LANDING: | MFT | | 3:01:51:53 MET | | 1032109 LBS | |
| 8 | | M/S 4/EV 2: | TDEL: | DRAG CHUTE DEPLOY: 179 KEAS | WEIGHT: | <u>LAT</u> : 18.4°S | | 166 X 164 NM | | CARGO TOTAL: | DOLILU-II I-LOADS: - First flight with only DOLILU-II I-Loads. DOLILU-II uplink #5. |
| | 0 | Daniel T. Barry P422/R209/M182 | 0.002/0.10 | 20:07:41:43Z | 218345 LBS | 18.4°S | | DEODDIT | | 2219721 LBS | Total I-load uplink #24. |
| 7 | 2 | | MAX Q NAV: | NLGTD: 6574 FT | X CG: 1083.3 | <u>LONG:</u> 145.5°W | | <u>DEORBIT</u> : 167 x 161 NM | | PERFORMANCE | FLIGHT DURATION CHANGES: None |
| MOOFOR | 1 (52) | SS EVA #31: EMU/Tethered EVA | 710 PSF 713 PSF | 20:07:41:51Z VEL: 146 KGS HDOT: -6.7 FPS | 1000.0 | 1 10.0 11 | | 107 X 101 14W | | MARGINS (LBS): FPR: 3775 | |
| MCC FCR- ASCENT/E | I (53) NTRY | EVA1 - 1/14/96 to 1/15/96 | CDD CTC | HDOT: -6.7 FPS | | | | VELOCITY: 25799 FPS | | | EVENTS: |
| | | Scheduled EVA #27 | <u>SRB STG</u> : 2:05.1 2:05 | BRK INIT: 86 KGS | 1 | | 3 | 25/99 FPS | | FINAL TDDP: 11447 | - Japanese SFU grapple at 2:01:16:19 MET, latch at 2:01:58:30 MET. Launched from Tanagashima, Japan OAST release 3/01:51:33 MET, grapple 5:00:06:15 MET, latch |
| WHITE FCI FOR ORBI | R (4) | by EV 1 and EV 2 6H09M19S Duration | | DRAG CHUTE | | | 2 | <u>ENTRY</u> | | RECON: 13346 | - OAST release 3/01:51:33 MET, grapple 5:00:06:15 MET, latch |
| FUR URDI | 1 023 | | <u>PERF</u> : NOMINAL | DRAG CHUTE JETTISON: 58 KGS | | | | RANGE: | | PAYLOADS: | 5:00:31:40 MET. - EVA 1 started at 3:19:52:51 MET. |
| FLIGHT DI | RECTORS: | <u>SS EVA #32:</u> EVA 2 - 1/16/96 to 1/7/96 | 2 ENG TAL (BEN): | 20:07:42:17Z | | THE PARTY NAMED IN | 200 | 4340 NM | | <u>PLB</u> : SPACE FLYER | - EVA 1 started at 5:19:52:31 MET. |
| A/E - J. W. LD/O 1 - B. | | Scheduled EVA #28 | 2:05 NO CALL | AVE BRK DECEL: 4.7 FPS/S | | | | TOP: EVA | 2 | UNIT (SFU) | |
| 0 2 - R. M. | | EMU/Tethered EVA | NEO DETUDNI | | A TOTAL | | | Barry, lov | Z WOT | UNIT (SFU) RETRIEVED | RENDEZVOUS #25: - Rendezvous, grapple, berth, and return of SFU. |
| PLNG - J. F | P. Shannon | by EV 1 and EV 3 | NEG RETURN: 4:03 4:07 | WHEELS STOP: | | ATHE. | | | | (JAPAN) | ŭ '' |
| MOD - J. W | | 6H53M41S Duration. To test and evaluate EVA hardware | | 20:07:42:46Z 12155 FT | | | * | left, & Chai | | ÒAST FLYER (DEPLOYED/ | RENDEZVOUS #26: - Deploy, rendezvous, grapple, and return of OAST Flyer. |
| A. L. | Briscoe | for Space Station use. | PTA (U/S 411): | ROLLOUT: | | | 5 | upper right | | RETRIEVED) | - ' ' |
| | | | 3:34 3:33 | 8767 FT | | | | | | SSBUV/A | SIGNIFICANT ANOMALIES: - FCS shutdowns and topping FES case icing. |
| | - | | DROOP: | 66 SEC | 15 PM | es | | BOTTOM: | EVA | SLA-01/GAS (5) | - FCS shuldowns and topping FES case icing. - EMU helmet light damage. |
| | | | | WINDS: | | | | 1 Scott ir | า | MIDDECK: | - FMU glove cut damage |
| 7 | | | PTM (U/S 411): | T6, R2 KTS OFFICIAL: 3206P08 | | | | P/L bay, Cl | hiao | PARE/NIH-R STL/NIH-C | - Loss of reception in left ear piece of EV 1. - Several EDFT-03 anomalies. |
| | A PARTIE | | 4:42 4:34 | T6, R1 | | | THE REAL PROPERTY. | is out of fra | me. | PCG-STES | - Several EDFT-03 anomalies. - OAST-FLYER unexpected trajectory dispersions. |
| | THE REAL PROPERTY. | | SE PTM (U/S-1073) | DENS ALT: | | 1 | 22 | | | CPCG | - MOC front end processors operating at 100%. |
| | | | 6:23 6:20 | -1007 FT | | | | Both EVA's | | 5 CRYO TK SETS | - RCS jet L1A fail off with maximum chamber pressure of 16 |
| 1 | 10 19 3 | | MECO CMD: | FLT DURATION: 8:22:00:40 | | | 100 | used to | | | PSI. - RCS jet R2U fail leak. Jet had oxidizer leak. |
| | | 1900 | 8:27.3 8:27.1 | 8:22:00:40 | | | 1 | demonstrate | 100 | RMS 44 (S.N. 303) | - Failure of SFU solar array panels to retract for capture and |
| 1 | | | <u>VI</u> : 26025.7 26025 | <u>S/T</u> : 579:13:07:16 | | A STATE OF | | assembly | , 100 | RMS used for SFU | berthing, jettisoned solar arrays. |
| STS072 0 | 844-010 | Crew: Front, It to rt | _ | OV-105: | WA T | | | techniques. | | grapple & berth, OAST deploy & | - SFU ĂHU thermal discrepancies. Flight SFU not wired same as training SFU. |
| right Box | m/MS CDE | R Duffy, & Chiao/MS. | OMS-2: | OV-105: 102:12:23:46 | 1 F. L. | | 8 | techniques . | | retrieve & EVA | - RMS wrist roll joint rate degradation. |
| | | T Jett, & Scott/MS. | 43:30 43:30 115.7FPS 115.7 FPS | DISTANCE: | 0 | 1 | 1 | | | support | - LO ₂ ET umbilical frangible nut detonator did not fire (pyro wiring |
| near. Wa | rata/IVIS, PL | - 1 Jell, & Scott/IVIS. | 110.7110 110.7110 | 3,700,00 sm | | - | | | | | problem). |

| SPACE SHUTTLE IVIISSIONS SUIVIIVI | | | | | | | | | | AIX I | 1 age 2 30 313 73 |
|--|---|-------------------------|--|---|----------------------------------|----------------------------------|-------------------------------|-------|-----|--|--|
| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS. | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-75 SEQ FLT #75 KSC-75 PAD 39B-31 MLP-3 MCC FCR ASCENT/E WHITE FC FOR ORB FLIGHT D A/E - R. D. LD//O 2 - C | R (5) T OPS RECTORS: Jackson . W. Shaw Pennington Castle Shannon | TITLE, NAMES | LIFTOFF TIME, LANDING SITES, | CROSSRANGE LANDING TIMES FLT DURATION, WINDS KSC 33 (KSC-29) 69:13:58:20Z 8:58:20 AM EST Saturday 16 3/9/96 (6) DEORBIT BURN: 69:12:55:43Z XRANGE: 234 NM ORBIT DIR: DL 36 AIM PT: CLOSE IN MLGTD: 2175 FT 69:13:58:20Z VEL: 189 KGS 211 KEAS HDOT: -1.0 FPS TD NORM 205: 2706 F1 DRAG CHUTE DEPLOY: 193 KEAS 69:13:58:28Z NLGTD: 6451 FT 69:13:58:36Z VEL: 130 KGS HDOT: -5.2 FPS BRK INIT: 100 KGS DRAG CHUTE JETTISON: 62 KGS 69:13:58:52Z AVE BRK DECEL: 3.8 FPS/S WHEELS STOP: | EMERG THROTTLE PROFILE | RSRM AND | INC | | (6) | WEIGHTS, PAYLOADS/ | (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) KSC W/D: OPF 64, VAB 5, PAD 25 = 94 days total. LAUNCH POSTPONEMENTS: - Baselined launch date of 2/15/96 on 10/13/94 Postponed launch date to 2/22/96 on 12/1/95. LAUNCH SCRUBS: NONE LAUNCH DELAYS: NONE TAL WX: - Both BEN (prime & selected) and MRN were forecast and observed GO. BYD was not available as an intact abort site due to local situation. DOLILU-II I-LOADS: - DOLILU II uplink #6, I-load uplink #25. FLIGHT DURATION CHANGES: - Extended flight 1 day for additional USMP science Decision to not try to land on orbit 235 due to forecast of low ceiling. Waved off landing on orbits 236 and 237 due to forecast of low ceiling. Extended flight second day for weather Waved off landing at KSC on orbit 251 due to forecast of low ceiling Total flight duration extension of 2 days plus one orbit. FIRSTS/LASTS: - First flight with thermocouple transducers on all 3 engines. EVENTS: - TSS deployed at 03:00:27:00 MET, tether broke at 03/05:11:35, tether length of 19,695 meters, and TSS separated rapidly from orbiter. Tether was rewound starting at 03:21:49:00 MET and boon retraction completed at 03:02:41 MET. SIGNIFICANT ANOMALIES: |
| Te | thered Satell | ite System (TSS) | PTA (U/S 242): 4:59 5:00 DROOP: PTM: 6:02 5:58 MECO CMD: 8:27.4 8:28.3 VI: 25877 25869 OMS-2: 39:56 39:52 223 FPS 222 FPS | 69:13:59:25Z 10635 FT ROLLOUT: 8460 FT 65 SEC WINDS: H13: 0X KTS OFFICIAL: 3312P20 H12, L2 DENS ALT: -1645 FT FLT DURATION: 15:17:40:21 S/T: 595:06:47:37 OV-102: 183:02:17:35 DISTANCE: 6,500,000 sm | sts075-77 (bottom c | enter) Cl Chang-l //S- ESA | OR Alle Diaz/PL , PLT F | | , | TISS-TIEM REFLIGHT (TSS-1R) U.S. MICROGRAVITY PAYLOAD SEMICONDUCTER EXPERIMENTS (USMP-3) OARE MIDDECK: TSS SUPPORT EQUIPMENT MGBX CPCG 5 CRYO TK SETS PLUS 4 EDO EDO PALLET NO RMS | - Feth MDM card 0 failure during FCS C/O, aerosurfaces not receiving commands from FA1 (waiver written to F/R 2-30A.2a, MDF or next PLS). - Topping FES core icing used, ice flush procedure Fuel cell 3 CPM not doing self-test H ₂ tank 4 heater A failure AC 1 phase B short caused loss of utility outlets J31 and J7 IMU 3 X and Y axis drift, compensations up to 8 sigma. Powered off to preserve lifetime. Used for entry but continued high drift rates MLS 2 did not lock on in range S-band transponder 2 failed to acquire TDRS (forward link) MOC processing problems APU 1 fuel pump inlet pressure decay TSS was lost when tether parted when being deployed (at 19.7 kilometers) Uncommanded SFMDM warm starts LH aft structure attach (to ET) blade valve not fully closed (debris catcher). |

| SPACE SHUTTLE IVISSIONS SUMIWARY Page 2-91 - \$15-76 | | | | | | | | | | | |
|--|--------------------|---|--|--|--|--------------------------|-------------|--|-------|---------------------------------------|--|
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
| | | (6) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (©) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, WINDS | PROFILE ENG. S.N. | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFIC:T ANOMALIES, ETC.) |
| STS-76 | OV-104 | CDR: | KSC PAD 39B | EDW 22, CONC | 104/104/ | BI-079 | 51.65° | DIRECT | OI-24 | CARGO: | KSC W/D: OPF 68, VAB 6, PAD 22 = 96 days total. |
| 313-70 | (Flight 16) | Kevin P. Chilton | 82:08:13:03.97 | I(EDW 45, CONC 26) | 109% | | (4) | INSERTION | (7) | 24605 LBS | 100 W.B. 011 00, VIB 0,1718 22 70 days total. |
| SEQ FLT #76 | Atlantis | (Flt 3 - STS-49, STS-59) | 3:13:04 AM EST (P) 3:13:04 AM EST (A) | 91:13:28:57Z | DDEDIOTED | RSRM | | DOOT ONG O | | DAVILOAD | LAUNCH POSTPONEMENTS: |
| FLT #76 | Spacehab 4 | P430/R145/V103/M129 | 3:13:04 AM EST (A) FRIDAY 15 | 5:28:57 AM PST SUNDAY 11 | PREDICTED: 100/104/104/ | 46 | | POST OMS-2: 158.5 x 85.1 | | <u>PAYLOAD</u> <u>CHARGEABLE</u> : | - Baselined launch date of 3/21/96 on 12/14/94. |
| KSC-76 | Эрасенав 4 | PLT: | 3/22/96 (6) | 3/31/96 (7) | 67/104 | ET-77 | | NM | | 14152 LBS | LAUNCH SCRUBS: |
| K3C-70 | OMS PODS: | Richard A. Searfoss (Flt 2 - STS-58) | | | | | | | | | - Scrubbed 3/21/96 Jaunch at FT tanking MMT on 3/20/96 at |
| PAD | LPO3-20 RPO4-16 | P431/R171/V126/M149 | <u>LAUNCH WINDOW:</u> 6M59S | <u>DEORBIT BURN</u> : 91:12:23:08Z | <u>ACTUAL</u> : 100/104/104/ | LWT-70 | | MIR-RNDZ MNVR AT | | DEPLOYED: 2814 LBS | approx. L-8 hours due to weather forecast of excessive RTLS crosswinds, chance of 5000' broken ceiling at KSC, and high |
| 39B-32 | FRC4-16 | | MIR PLANAR/ | 91.12.23.002 | 69/104 | | | 1/01:11 MET | | 2014 LD3 | seas in SRB recovery area. |
| MLP-2 | | M/S 1 (PAYLOAD CDR): Ronald M. Sega | PHASE WINDOW | XRANGE: 763 NM | | <u>ET</u> | | 210 x 127 NM | | NON-DEPLOYED: | , |
| | | (Flt 2 - STS-60) | FOM DLC: VCC | ODDIT DID. DD 1/ | 1 = 2035 (3) | <u>RPT</u> 271K | | TI: | | 10578 LBS | LAUNCH DELAYS: None |
| | | (Flt 2 - STS-60) P432/R175/V127M153 | EOM PLS: KSC TAL: ZZA | ORBIT DIR: DR 16 | 2 = 2109 (16) 3 = 2019 (16) | 2/1K | | 1:15:28:01 MET | | MIDDECK: | TAL WX: |
| | | M/S 2/EV 2: | TAL WX: MRN, BEN | <u>aim Pt</u> : Nominal | | <u>ET</u> | | 215.8 x 206.3 | | 760 LBS | - ZZA (prime and selected) and MRN were forecast and observed GO. BEN forecast and observed NO GO for ceiling and visibility. |
| | | M. Richard Clifford | OEL FOTED | | M 3 EOM: | BR/UP | | NM | | OLULTTI E | GO. BEN forecast and observed NO GO for ceiling and visibility. |
| | | (Flt 3 - STS-53, STS-59) | <u>SELECTED</u> : <u>RTLS</u> : KSC 33/CI/N | MLGTD: 2185 FT 91:13:28:57Z | WEIGHT: 211913 LBS | 269K | | DEORBIT: | | SHUTTLE ACCUMULATED | DOLILU-II I-LOADS: |
| | | P433/R157/V104/M139 | TAI: 77A 30/N/N | VFI: 204 KGS | X CG: | ET | | 216 X 206 NM | | WFIGHTS: | - DOLILU-II I-Loads uplinked (#8), I-Load uplink #27. |
| | | M/S 3/EV 1: | AOA: KSC 33/CI/N | 198 KEAS | 1082.76 | <u>IMPACT</u> | | | | DEPLOYED: | |
| | | Linda M. Godwin (Flt 3 - STS-37, STS-59) | <u>PLS</u> : EDW 22/N/N | HDOT: -1.6 FPS | LANDING: | 1:25:49 MET | | VELOCITY: 25898 FPS | | 818721 LBS NON-DEPLOYED: | SPACE SHUTTLE NIGHT LAUNCH: #13 |
| | | P434/R122/V105/F13 | TDEL: | TD NORM 195: | WEIGHT: | LAT: | | 23070113 | | 1065306 LBS | FLIGHT DURATION CHANGES/LANDING SITE CHANGE: |
| | | | 0.09 0.492/0.49 | 2433 FT | 211805 LBS | 0.1°N | | <u>ENTRY</u> | | CARGO TOTAL: | - MMT decision on 3/28/96 to land 1 day early on 3/30 (forecast of |
| | | M/S 4: Shannon W. Lucid | MAY O NAV | DDAC CHUTE | X CG: 1084.46 | <u>LONG</u> : 125.4°W | | RANGE: 4243 NM | | 2276332 LBS | low ceiling & fog). |
| | | (Flt 5 - STS 51-G, STS-34, | MAX Q NAV: 720 PSF 724 PSF | DRAG CHUTE DEPLOY: 188 KEAS | 1084.40 | 125.4 W | | 4243 IVIVI | | PERFORMANCE | - Loss of APU 3 imposed weather placards, flight rule 10-4A Waved off landing at KSC on orbit 129 due to overcast ceiling. |
| | | STS-43, STS-58, to return | 52 SECS MET | 91:13:29:00Z | | | | | | MARGINS (LBS): | - Waved off landing at KSC on orbit 130. Extended flight 1 day to |
| | | on STS-79) P435/R65/V45/F6 | CDD CTC: | NI CTD. F747 FT | | | | | | FPR: 3775 | original duration. |
| | | | <u>SRB STG</u> : 2:05.5 2:09 | NLGTD: 5747 FT 91:13:29:08Z | | | | | | FUEL BIAS: 1136 FINAL TDDP: 3140 | - Waved off landing at KSC on orbit 144 due to ground fog. Changed landing site to EDW. |
| | | SS EVA #33 | | VEL: 154 KGS | | | | | | RECON: 3563 | - Total flight duration extension: one orbit. |
| | | Tethered with SAFER CTGY EV 1 - Linda Godwin | <u>PERF</u> : NOMINAL | HDOT: -5.0 FPS | | | | | | 544,0450 | |
| | | EV 2 - Rich Clifford | 2 ENG TAL (BEN): | BRK INIT: 116 KGS | NM21-727 | -030 (23 | March | 1996) Atla | antis | <u>Payloads</u> : Plb: | FIRSTS/LASTS: Mir docking at 01:19:20:26, batch apoping at 01:20:19:00 MET |
| | | Scheduled EVA #29 | 2:25 2:28 | DKK IIVIT. 110 KGS | as seen fro | | | | | SHUTTLE/MIR | - Mir docking at 01:18:39:26, hatch opening at 01:20:18:00 MET. - Shannon Lucid transferred to Mir 21 crew at 02:04:29:00 MET |
| | | To install MEEP on Mir DM, evaluate EVA H/W, aids & | | DRAG CHUTE | | | | | | MISSION 3 | 1(84:12:42:04Z) and will return on \$15-79. |
| | | tools. | NEG RETURN: 4:06 4:09 | <u>JETTISON</u> : 54 KGS 91:13:29:31Z | | | | | 3.0 | SPACEHAB 4 | - Fifteen CWC's, total of 1506 lbm water, 42 lbm N ₂ , 62 lbm O ₂ , 614 lbm food transferred to Mir. |
| | | 3/27/96 - 6:02:28 Duration | 4.00 4:09 | 71.13.27.312 | 1 | | | | 500 | SYSTEM (ODS) | - First EVA during orbiter/Mir docked operations at 04:22:23 MET. |
| 130 | N SEAR | | PTA (U/S 242): | AVE BRK DECEL: | 7 | | S. S. S. S. | | | ` ′ | - Mir undocking at 06:16:54:59 MET. |
| Sill's | + 100 | \ | 4:23 4:24 | 5.4FPS/S | | 1 | Sec. | | - | <u>MIDDECK</u> : KIDSAT | - Last flight from old MCC (FCR-1). First flight controlled from old |
| 4 + t | L. Shak | .\ | DROOP (ZZA): | WHEELS STOP: | A Charles | | | 5 | State | KIDSAT SAREX-II | MCC was Gemini 4. |
| 9 <u>H</u> + | + + 1/4 | 5 | 5:24 5:23 | 91:13:29:52Z | 圖町 衛 | | 17 | | | S. INEX II | RADIATOR DEPLOY #18: |
| σ = | | हें | DTM | 10579 FT | | . 6 | Mary and | STATE OF THE PARTY | 1 | | - Port radiator deployed for 47 hours to conserve water for |
| 18 | | / | <u>PTM</u> : 5:58 | ROLLOUT: | | | 1 | | 1 | 5 CRYO TK SETS | transfer to Mir. |
| CIFFE | PRD GOOWIN | | 5.54 5.50 | 8394 FT | W. Carlot | | 7 | | 1 | | RENDEZVOUS #27: |
| | | | SE TAL (ZZA): | 55 SEC | A60007 | - Allerander | | | | NO RMS | - Rendezvous and third docking with Mir Space Station (third |
| | | | 5:54 6:09 | WINDS: | The second of | The same | | 3 | | | docking flight). |
| | | MCC FCR-1 (55) | MECO CMD: | H0, L1 KTS | | | | and they | | | |
| | | ASCENT ONLY | 8:32.6 8:33.2 | OFFICIAL: | The state of the s | | 98 | | 1 | | Continued |
| | | Continued | Continued | 1301P04 T0, L1 | La Section | | | | | | |
| | | 200111 | Continued | Continued | | | | | | | |

| | FLT | ORBITER | CREW (6) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|---|--------|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|---------|--------------------------|---|
| | NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFIC:T ANOMALIES, ETC.) |
| S | STS-76 | | Continued | Continued | Continued | | 1-00 | 0 | | STOP OF | h * 6. | Continued |

DENS ALT: 1536 FT WHITE FCR (6) ORBIT OPS & ENTRY 25878 25871 FLT DURATION: 9:05:15:53 FLIGHT DIRECTORS: A/E - J. W. Bantle LD/O 1 - P. L. Engelauf 42:18.5 42:21.9 77.1 FPS 76.8 FPS <u>S/T</u>: 604:12:03:30 O 2 - W. D. Reeves PLNG - P. F. Dye MOD - R. E. Castle <u>OV-105:</u> 110:13:35:54 DISTANCE: 3,800,000 sm

Above: STS076-724-016 -- Clifford works at restraining bar on Mir Docking Module. Clifford and Godwin mark first EVA while MIR & Shuttle are docked.

Below: NM21-399-001 --- Aboard Mir Base Block Module Lucid works out on treadmill.



- SIGNIFICANT ANOMALIES:
 Hydraulic System 3 leak during ascent (approximately 20% fluid lost), kept in low pressure for entry, F/R waiver S063689CU.
 WSB 3A failed to cool during ascent.
 WSB 2 overcooked post-MECO.
 Loss of PLBD centerline 9-12 release microswitch inclinations

- postlanding wave-off.
- WSB 3B steam vent heater transient failure.
- R4R fail off (low chamber pressure).
- L2L fail leak (oxidizer leak).
- L2U fail off (low chamber pressure).
- EVA camera bracket not onboard.
 EV 2 biomed (ECG) signal conditioner failed.
 EMU 2 battery power discrete fail on.
 MCC loss of forward link during countdown.
 Loss of KCA forward link.

- Water transfer mineral syringe failed to inject.



Continued

STS076-371-002 (25 March 1996) --- Inflight crew portrait on mid deck. From left on front row: Godwin/MS. CDR Chilton, and PLT Searfoss. Left to right on back row: Clifford/MS, Lucid/MS and payload commander Sega/PLC. Lucid later joined Mir-21 crew for first leg of her five-month stay.

| | SPACE SHUTTLE IVIISSIONS SUIVIIVIART | | | | | | | | | | | |
|---------------------------|--|---|---|--|--|---|---------------|--|-----|--|--|--|
| | ORBITER | CREW (6) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, | |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) | |
| STS-77 SEQ FLT #77 KSC-77 | OV-105 (Flight 11) Endeavour | CDR: John H. Casper (Fit 4 - STS-36, STS-54, STS-62) P436/R111/V86/M99 PLT: | KSC PAD 39B 140:10:29:59.973Z 6:30:00 AM EDT (P) 6:30:00 AM EDT (A) Sunday 9 5/19/96 (3) | KSC 33 (KSC 30) 150:11:09:20Z 7:09:20 AM EDT Wednesday 8 5/29/96 (6) DEORBIT BURN: | 104/104/ 109% PREDICTED: 100/104/104/ 67/104 | BI-080 RSRM 47 ET-78 LWT 71 | 39.03° (5) | DIRECT INSERTION POST OMS-2: 152.9 x 152.8 NM | | CARGO: 35205 LBS PAYLOAD CHARGEABLE: 27393 LBS | KSC W/D: OPF 69, VAB 5, PAD 27 = 101 days total. LAUNCH POSTPONEMENTS: - Baselined launch date of 4/25/96 on 6/19/95 Postponed launch date to 5/16/96 on 9/11/95 Postponed launch date to 5/19/96 on 5/14/96 (Atlas launch had range priority). | |
| PAD 39B-33 MLP-1 | OMS PODS: LPO4-18 RPO5-9 FRC5-11 | Curtis L. Brown (Fit 3 - STS-47, STS-66) P437/R152/V112/M136 M/S 1: Andrew S. W. Thomas P438/R213/M186 M/S 2: Daniel W. Bursch (Fit 3 - STS-51, STS-68) | LAUNCH WINDOW: 2H30M CTOB EOM PLS: KSC TAL: BEN TAL WX: MRN, ZZA SELECTED: RTLS: KSC 33/N/N TAL: MRN 20/N/N AOA: KSC 33/N/N | XRANGE: 314 NM ORBIT DIR: DR 17 AIM PT: CLOSE IN MLGTD: 1687 FT 150:11:09:20Z VEL: 216 KGS 216 KEAS HDOT: -4.6 FPS | ACTUAL: 100/104/104/ 67/104 1 = 2037 (2) 2 = 2040 (1) 3 = 2038 (3) M 3 EOM: WEIGHT: 222399 LBS | ET RPT 271K ET BR/UP 214K | | SPARTAN DEPLOY: 153.6 x 150.4 NM SPARTAN GRAPPLE: 153.1 x 152.0 NM PAMS/STU | | SHUTTLE ACCUMULATED | LAUNCH SCRUBS: None. LAUNCH DELAYS: None. TAL WX: - BEN (prime) was forecast NO-GO for broken ceiling but observed GO at TAL landing time. MRN was forecast GO, selected, and observed GO. ZZA was forecast GO but observed NO-GO for broken ceiling at TAL landing time. | |
| | ROWN THOMAS BURSCH RUKCO RNEAU | M/S 3: Mario Runco, Jr. (Fit 3 - STS-44, STS-54) P440/R137/V89/M122 M/S 4: Marc Garneau (Canada) (Fit 2 - STS 41-G) P441/R47/V128/M44 MCC WHITE FCR (7) (ALL OPS) | PLS: EDW 22/N/N | TD NORM 205: 2536 F I DRAG CHUTE DEPLOY: 191 KEAS 150:11:09:27Z NLGTD: 6612 FT 150:11:09:35Z VEL: 150 KGS HDOT: -4.8 FPS BRK INIT: 99 KGS DRAG CHUTE JETTISON: 59 KGS | X CG: 1080.45 | ET IMPACT 1:24:57 MET LAT: 2.97°N LONG: 138.89°W | | DEPLOY: 152.6 x 152.0 NM DEORBIT: 154 x 147 NM VELOCITY: 25763 FPS ENTRY RANGE: 4378 NM | | WEIGHTS: DEPLOYED: 819825 LBS NON-DEPLOYED: 1089758 LBS CARGO TOTAL: 2311537 LBS PERFORMANCE MARGINS (LBS): FPR: 3080 FUEL BIAS: 900 FINAL TDDP: 5381 RECON: 8528 | DOLILU-II I-LOADS: - DOLILU-II uplink #8, I-load uplink #27. FLIGHT DURATION CHANGES: None. Flight was planned to be 10 days assuming 5/19/96 liftoff; hence, this does not count as a flight duration change. FIRSTS/LASTS: - First flight with all 3 Block I engines First flight to be controlled completely from the new MCC (White FCR). EVENTS: - SPARTAN deployed at 1:01:59:12 MET SPARTAN grappled at 2:04:22:34 MET and berthed at | |
| free flyer | artan 207 above PACEHAB | FLIGHT DIRECTORS: A/E - R. D. Jackson LD/O 2 - N. W. Hale O 1 - B. P. Austin PLNG - L. J. Ham MOD - J. W. Bantle | NEG RETURN: 3:59 4:00 PTA (U/S 249): 4:45 4:36 DROOP (BYD): 5:23 5:23 | AVE BRK DECEL: 6.8 FPS/S WHEELS STOP: 150:11:10:11Z 10978 FT ROLLOUT: 9291 FT 51 SEC WINDS: | * * * | * * * | | | | PAYLOADS: PLB: SPACEHAB-4 SPARTAN 207/IAE TEAMS (GANE, LMTE, VTRE, PAMS/STU (deployed)) GBA (12 BETSCE | 2:05:25:41 MET PAMS/STU deployed at 2:22:50:00 MET. RENDEZVOUS #28: Rendezvous, capture, and berth (return) of SPARTAN-207). RENDEZVOUS #29, #30, & #31: Rendezvous & PROXIVOUS OPS with PAMS/STU payload. *STS-77 still holds the record for most number of rendezvous | |
| | NASA N | SPACEMAB | PTM: 5:41 5:32 MECO CMD: 8:27.66 8:28.1 VI: 25865 25856 OMS-2: 41:47 41:47 2:06 2:07 198.5 FPS 198.6 FPS | HO. L6 KTS OFFICIAL: 2607P9 H2, L7 DENS ALT: 1012 FT FLT DURATION: 10:00:39:20 S/T: 614:12:42:50 OV-105: 112:13:03:06 | Left to ri | ght, front nd Runce | : Thon MS. | t crew portra nas/MS, CDR Back row: PI A & Bursc/M | it. | MIDDECK: ARF-01 BRIC-07 5 CRYO TK SETS RMS 45 (S.N. 301) RMS used for SPARTAN 207 deploy, retrieve, and berth (IAE deployed from SPARTAN). | operations of any space flight"- From Wayne Hale's blog: http://blogs.nasa.gov/cm/newui/blog/viewpostlist.jsp?blogname=waynehalesblog - "My Favorite Shuttle Flight" posted May 26, 2010. SIGNIFICANT ANOMALIES: - IPS file server (MPSR1) disk crash prelaunch FES failure to come out of standby PCS 1 O ₂ supply transducer failed WSB 2 failed to cool during ascent APU 2 fuel pump seal cavity drain line pressure decay WSB 3 overcool during entry RCS jet F2F fail leak (oxidizer leak) RCS jet R3A heater failed off. | |

| | | | 3P | IVI IVI | ARY | Page 2-94 - STS-78 | | | | | |
|----------------|----------------------|--|--|---|-----------------------------|----------------------------|---------|------------------------------------|-------|--------------------------------------|--|
| | | CREW | LAUNQUATE | LANDING SITE/ | SSME-TL | CDD | | ODDIT | | DAVILOAD | MICCIONALICATIO |
| FLT | ORBITER | (7) | LAUNCH SITE, LIFTOFF TIME, | RUNWAY, CROSSRANGE | NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | ONDITER | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-78 | OV-102 | CDR: | KSC PAD 39B | WINDS KSC 33 (KSC 31) 189:12:36:36Z 8:39:36 AM EDT | ENG. S.N. 104/104/ | BI-081 | 39.03° | DIRECT | OI-24 | CARGO: | KSC W/D: OPF 63, VAB 7, PAD 19 = 89 days total. |
| | (Flight 20) | Terence T. (Tom) Henricks | 172:14:48:59.98Z | 189:12:36:36Z 8:30:36 AM EDT | 109% | | (6) | INSERTION | (9) | 31854 LBS | , |
| SEQ FLT #78 | Columbia | (Flt4 - STS-44, STS-55 STS-70) | 40 40 00 444 EDT /45 | Sunday 12 | PREDICTED: | RSRM 55 | | POST OMS-2: | | PAYLOAD | LAUNCH POSTPONEMENTS/ADVANCEMENTS: - Baselined launch date of 6/27/96 on 3/30/95. |
| | 19th | P442/R135/V93/M120 | Thursday 22 | 7/7/96 (7) | 100/104/104/ 67/104 | FT 70 | | POST OMS-2: 153.6 X 146.7 NM | | CHARGEABLE: 23666 LBS | - Advanced launch date to 6/20/96 on 3/21/96. |
| KSC-78 | Spacelab Flight | <u>PLT</u> : Kevin Kregel | | <u>DEORBIT BURN:</u> 189:11:36:36Z | | ET-79 | | | | | LAUNCH SCRUBS: None |
| PAD | LM-13 | Kevin Kregel (Flt 2 - STS-70) | LAUNCH WINDOW: 2H30M CTOB | | ACTUAL: 100/104/104/ | LWT 72 | | TRIM 1 BURN: 4:30:00 MET | | <u>DEPLOYED</u> : 0 LBS | LAUNCH DELAYS: None |
| 39B-34 | | P443/R197/V129/M172 | | <u>XRANGE</u> : 91 NM | 67/104 | 12 | | 146.6 X 146.4 | | | |
| MLP-3 | EDO 8 | M/S 1: | EOM PLS: KSC TAL: BEN | ORBIT DIR: DR 18 | 1 = 2041 (1) | <u>ET</u> <u>RPT</u> | | NM | | NON-DEPLOYED: 21598 LBS | TAL WX: - BEN (prime and selected) and MRN were forecast and |
| | OMS PODS: | Richard M. Linnehan | TΔI W/X·MPNI 77Δ | AIM PT: NOMINAL | 2 = 2039(2) | 271.3K | | TRIM 2 BURN: 15:23:29:00Z | | | observed GO. ZZA was forecast and observed NO-GO |
| | LPO5-9 RPO1-24 | P444/R214/M187 | SELECTED: | MLGTD: 2300 FT 189:12:36:36Z | 3 = 2036 (3) | <u>ET</u> | | 15:23:29:00Z 142.3 X 129.6 | | MIDDECK: 2066 LBS | (thunderstorms within 20 NM). |
| | FRC2-20 | M/S 2 (PAYLOAD CDR): | RTLS: KSC 33/N/N | MLGTD: 2300 FT 189:12:36:36Z VEL: 214 KGS 208 KEAS | M 3 EOM: | BR/UP | | NM | | | DOLILU-II I-LOADS: DOLILU-II uplink #9, I-load uplink #28 |
| | | Susan J. Helms (Flt 3 - STS-54, STS-64) | AOA: EDW 22/N/N | HDOT: -1.3 FPS | WEIGHT: 229134 LBS | 214K | | DEORBIT: | | SHUTTLE ACCUMULATED | FLIGHT DURATION CHANGES: |
| | | P445/R158/V108/F19 | PLS: EDW 22/N/N | TD NORM 205: 2515 FT | X CG: 1081.88 | <u>ET</u> <u>IMPACT</u> | | 142 X 130 NM | | WEIGHTS: DEPLOYED: | - Extended flight 1 day to 17 days for additional science (planned 16 + 1). |
| | | M/S 3: | TDEL: | | | 1:24:50 | | <u>VELOCITY</u> : 25749 FPS | | 819825 LBS | (planned 16 + 1). |
| 10 | AS MAD | Charles E. Brady, Jr. P446/R215/M188 | 0 -0.178/0.02 | DRAG CHUTE DEPLOY: 191 KEAS | <u>LANDING</u> : WEIGHT: | MET <u>LAT</u> : | | 25749 FPS | | <u>NON-DEPLOYED</u> : 1113422 LBS | EVENTS: - Longest space shuttle flight to date. |
| HENRIC | + + | F440/K213/W100 | MAX Q NAV: | 189:12:36:40Z | 228986 LBS | 2.86°N | | ENTRY | | CARGO TOTAL: | , , , , , , , , , , , , , , , , , , , |
| | T 7. 8 | P/S 1: Jean-Jacques Favier | 705 714 | <u>NLGTD</u> : 6537 FT 189:12:36:48Z VEL: 158 KGS | X CG: 1083.40 | <u>LONG</u> : 138.9°W | | RANGE: 4466 NM | | 2343391 LBS | RADIATOR DEPLOY #19: Full deploy for cooling. |
| E A | | (France) | SRB STG: | VEL: 158 KGS HDOT: -5.2 FPS | 1003.40 | 130.7 W | | 4400 14101 | | <u>PERFORMANCE</u> | SIGNIFICANT ANOMALIES: |
| STEEL WAY | - 13/63 | P447/R216/M189 | 2:04.6 204 | BRK INIT: 124 KGS | | | | | | MARGINS (LBS): FPR: 3080 | - Main engine 2036 violated thrust build up rate at engine start (>14,000 lbs thrust change for any two consecutive 20 millisec |
| LI | NNEHAN | <u>P/S 2</u> : | <u>PERF</u> : NOMINAL | DRAG CHUTE | | | | | | FUEL BIAS: 900 | time intervals) |
| | | Robert B. Thirsk (Canada) | 2 ENG TAL (BEN): | <u>JETTISON:</u> 189:12:37:12 Z | | | | | | FINAL TDDP: 3683 RECON: 4245 | - MPS LH2 low level cutoff sensors indicated dry (flashed) 2.3 seconds after MECO during shutdown transient flow (changed |
| | | P448/R217/M190 | 2:43 2:41 | 59KGS | | | | | | DAVI OADC | MIXTURE RATIO FOR \$15-79 to 6.020). |
| | | MCC WHITE FCR (8) | NEG RETURN: | AVE BRK DECEL: 5.6FPS/S | A second | V - | 2 | đu | V | PLB: | - Heavy sooting and heat effect (discoloration and charring) observed on insulation interfaces within STS-78 field joints. No heat effects to metal interface or capture feature o-ring, no gas past CF O-rings. (Environment process change this fight to J-leg adhesive and joint cleaning process.) Postponed STS-79 to use STS-80 stack with old processing. - Center MPS LH2 inlet pressure failed OSH BFS I/O TERMINATE B discrete toggling low. BFS moved to |
| | | FLIGHT DIRECTORS: | 3:57 3:59 | WHEELS STOP: | E - | | | | 1 | LIFE AND MICROGRAVITY | heat effects to metal interface or capture feature o-ring, no gas |
| | | A/E - J. W. Bantle | PTA (U/S 240): | 189:12:37:31Z 11639 FT | | 100 | | | | SCIENCES (LMS) | leg adhesive and joint cleaning process.) Postponed STS-79 to |
| sts078-73 | 30-033 crogravity | LD/O 2 - J. P. Shannon O 1 - P. L. Engelauf | 5:15 5:15 | | 00 | | 170 | | | Musculoskeletal Physiology, Fluid | use STS-80 stack with old processing. - Center MPS LH2 inlet pressure failed OSH |
| Sciences | /L N/C) : | O 3 - B. P. Austin | DROOP: | ROLLOUT: 9339 FT | 1 | TO OF | · W | | -// | Physics, Advanced | - BFS I/O TERMINATE B discrete toggling low. BFS moved to |
| PLB. | (=) | O 4 - C. W. Shaw MOD - A. L. Briscoe | | 55 SEC WINDS: | | C. | | EST | | Semiconductory and Metal Alloys | |
| Marin College | | | PTM (U/S 240): | T3, L1 KTS OFFICIAL: 1803P5 | | 4 | | A | 1 | Processing | core freeze-up during deorbit prep. High-load core was flushed. |
| | 1 | AV | 5:47 5:45 | OFFICIAL: 1803P5 T3, L2 | 1 | | | A A | | (SPACELĂB LM) OARE | - FES high-load duct temps low during ascent and high-load core freeze-up during deorbit prep. High-load core was flushed FES topping core freezeup at 2 days 1 hour MET and during deorbit prep. Core flush procedure per |
| | | | MECO CMD: 8:27.9 8:29.6 | DENS ALT: 854 FT | The same of | 1 | | | | MIDDECK. | - Cryo N₂ tank 4B heater failed. - Spacelab EPDB 2 AC phase A amps and EPDB 3 AC phase |
| | | | | | | | | | | MIDDECK: BRIC | C amps transducer failures. |
| 0 | 1 | | <u>VI</u> : 25865.4 25856 | <u>FLT DURATION</u> : 16:21:47:35 | sts078-39 | 7-030 Cu | ew nos | ses in LMS-1 | | SAREX II | - Loss of MCC read/write (aka HA) servers. - APU 1 fuel pump seal leakage more severe that seen on |
| | | | 0.40 | <u>S/T</u> : 631:10:30:25 | | | | center. Othe | rs, | 5 CRYO TK SETS | STS-75. |
| | | | | | clockwise: | Favier/I | PS (Fra | nce), Thirsk/ | | + 4 EDO, 5 GN2 TANKS | - APU 1 turbine speed transducer erratic. - WSB 1 ready indication intermittent (or bypass valve |
| - | Cod Same | | OMS-2: 41:28.7 41:28.6 185.6 FPS 185.7 FPS | 200:00:05:10 | (Canada), | | | | | EDO PALLET | indication). |
| | | | 1.07 | <u>DISTANCE</u> : 7,046,000 sm | Linnehan/ | ivis, and | CDR | ienricks. | | NO RMS | |
| | | | • | | | | | | | | |

| | SPACE SHOTTLE IVISSIONS SUIVINANT | | | | | | | | | | |
|----------------|-----------------------------------|--|--|---------------------------------------|--------------------------------|----------------------------|--------|------------------------|-------|-------------------------------|--|
| | | CREW | | LANDING SITE/ | SSME-TL | 000 | | 00017 | | 541// 645 14/5/61/50 | . WOODON / WOUNTO |
| FLT | ORBITER | (7) | LAUNCH SITE, LIFTOFF TIME, | RUNWAY, CROSSRANGE | NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS |
| | URBITER | 6 UP / 6 DOWN | · · | | | | | | FSW | | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, WINDS | PROFILE ENG. S.N. | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-79 | OV-104 | CDR: | KSC PAD 39A | KSC 15 (KSC 32) | 104/104/ | BI-083 | 51.67 | DIRECT | OI-25 | CARGO: | KSC W/D: OPF 73 (2), VAB 17 (3), PAD 25 (3) = 115 days total |
| | (Flight 17) | William F. Ready | 260:08:54:48.96Z | 270:12:13:13Z | 109% | | (5) | INSERTION | | 27812 LBS | |
| SEQ FLT #79 | Atlantis | (Flt 3 - STS-42, STS-51) P449/R140/V96/M125 | 4:54:49 AM EDT (P) 4:54:49 AM EDT (A) | 8:13:13 AM EDT | PREDICTED: | RSRM | | POST OMS-2: | | <u>PAYLOAD</u> | LAUNCH POSTPONEMENTS: - Baselined 8/1/96 launch date on 5/4/95. |
| FL1 #79 | Spacehab 5 | P449/R140/V90/W125 | | Thursday 8 | 100/104/104/ | 56 | | 158.6 X 85.3 | | CHARGEABLE: | - 5/4/95 launch date was postponed when the shuttle was rolled |
| KSC-79 | · | PLT: | 9/16/96 (8) | 9/26/96 (9) | 67/104 | ET-82 | | NM | | 19039 LBS | back from pad A to VAB on 7/10/96 under threat from Hurricane |
| | OMS PODS: | Terrence W. Wilcutt | LAUNCH WINDOW: | DEODDIT DUDN. | A CTUAL. | LVA/T | | NO(: | | DEDLOVED. | Bertha. |
| PAD | LPO3-21 RPO4-17 | (Flt 2 - STS-68) P450/R183/V130/M160 | 5:47M | <u>DEORBIT BURN:</u> 270:11:06:14Z | <u>ACTUAL</u> : 100/104/104 | LWT 75 | | NC6: 2:14:05:33 MET | | <u>DEPLOYED</u> : 3170 LBS | - Due to STS-78 booster sooting and heat effects in field joints, |
| 39A-45 | FRC4-17 | | MIR PLANAR/ | 270.11.00.142 | 67/104 | 73 | | 203.7 X 201 | | 3170 EB3 | decision was made to restack using STS-80 SRB's (and ET) which used old process. Set launch date to 9/12/96. |
| MLP-1 | | <u>M/S 1:</u> | PHASE WINDOW | XRANGE: 777 NM | 4 0040 (40) | ET | | NM | | NON-DEPLOYED: | - Rolled out to pad A on 8/30/96. |
| | | Jay Apt (Flt 4 - STS-37, STS-47, | EOM PLS: KSC | ORBIT DIR: DR 19 | 1 = 2012 (18) 2 = 2031 (14) | PRED RPT: | | NC2· | | 15151 LBS | - Rolled back to VAB 9/4/96 under threat of Hurricane Fran. Postponed launch to 9/16/96. Rolled to pad on 9/6/96. |
| | | STS-59) | <u>TAL</u> : ZZA | OKDIT DIK. DK 17 | | 271.3K | | NC2: 2:15:38:10 MET | | MIDDECK: | 1 ostponed launtin to 3/10/30. Rolled to pad on 3/0/30. |
| | | P451/R123/V79/M110 | <u>TAL WX</u> : MRN, BEN | <u>aim PT</u> : Close in | , , | | | 208.8 X 201.9 | | MIDDECK: 718 LBS | LAUNCH SCRUBS: None |
| | | <u>M/S 2</u> : | SELECTED: | MLGTD: 807 FT | M 3 EOM: | <u>ET</u> BRKUP: | | NM | | SHUTTLE | LAUNCH DELAYS: None |
| | | Thomas D. Akers | RTLS: KSC 33/N/SF | 270:12:13:13Z | WEIGHT: | 214K | | SEP BURN: | | ACCUMULATED | LAUNCH DELATS. None |
| | | (Flt 4 - STS-41, STS-49, | TAL: ZZA 30/N/SF AOA: KSC 15/CI/N | VEL: 217 KGS | 215990 LBS | | | 7:16:49:15 MET | | WFIGHTS: | <u>LAUNCH WINDOW</u> : |
| | | STS-61) P452/R115/V74/M103 | PLS: EDW 22/N/N | 217 KEAS HDOT: -4.3 FPS | X CG: 1081.31 | <u>ET</u> <u>IMPACT</u> | | 211 X 201.3 NM | | DEPLOYED: 822995 LBS | - Mir rendezvous planar/phase window was 7M00S; however, |
| | | P432/K113/V/4/W1103 | | ПРОТ4.5 ГРЗ | 1001.31 | 1:26:47 | | INIVI | | NON-DEPLOYED: | - Mir rendezvous planar/phase window was 7M00S; however, it was limited to 5M47S due to a negative performance margin (-523 lbs) at window opening. Liftoff was delayed (per plan) for 36 seconds for zero performance margin plus an additional |
| | | <u>M/S 3:</u> | <u>TDEL</u> : 0.06 -0.018/0.02 | TD NORM 195: | LANDING: | MET | | DEORBIT: | | 1129291 LBS | for 36 seconds for zero performance margin plus an additional |
| | | Carl E. Walz (Flt 3 - STS-51, STS-65) | 0.00 -0.010/0.02 | 2496 FT | WEIGHT: 215904 LBS | <u>LAT</u> : 0.65°S | | 209.1 X 197.7 NM | | CARGO TOTAL: 2371203 LBS | 10 seconds (total delay 46 seconds) which allowed approx + 200 lbs APM (wind, loads allowance). |
| | | P453/R170/V106/M148 | MAX Q NAV: 697 705 | DRAG CHUTE | X CG: | 0.03 3 LONG: | | INIVI | | 23/1203 LD3 | + 200 IDS APIVI (WITH, IDAUS AHOWATICE). |
| | | | 697 705 | DEPLOY: 192 KEAS | 1083.02 | 125.96°W | | VELOCITY: | | <u>PERFORMANCE</u> | SHUTTLE NIGHT LAUNCH #14 |
| | | M/S 4: Ascent | SRB STG: | 270:12:13:22Z | | | | 25892 FPS | | MARGINS (LBS): FPR: 4456 | DOLILU-II I-LOADS: DOLILU-II uplink #10, I-load uplink #29. |
| | | John E. Blaha | 2:02.4 2:05 | NLGTD: 5760 FT | | | | ENTRY | | FUEL BIAS: 432 | DOLILO-II I-LOADS. DOLILO-II upiliik # 10, 1-10au upiliik #29. |
| | EADOV | (Flt 5 - STS-29, STS-33, | PERF: NOMINAL | 270:12:13:29Z | | | | RANGE: | | FINAL TDDP: 462 | FLIGHT DURATION CHANGES: Extended 1 day for additional |
| WILCOTT N | STS AKERS | STS-43, STS- 58, stay on | <u> </u> | VEL: 150 KGS | | | | 4276 NM | | RECON: 716 | science. |
| 2 | 19 | Mir 22, and return on STS-81) | <u>2 ENG TAL (ZZA)</u> : 2:38 2:35 | HDOT: -4.2 FPS | | | | | | PAYLOADS: | FIRSTS: |
| | | P454/R97/V48/M88 | | BRK INIT: 89 KGS | | | | | | PLB: | - First U.S. spaceflight with female flight director for entry/ landing |
| | Special | MIC A. | NEG RETURN: | DDAC CHUTE | | | | | | SHUTTLE/MIR | (Linda Ham). |
| ELSHUT | ILE.MAP/ | M/S 4: Descent | 4:06 4:03 | DRAG CHUTE JETTISON: 55 KGS | | | | | | MISSION 4 SPACEHAB 5 | RENDEZVOUS #32: Rendezvous and dock with Mir (fourth |
| (1111) | | Shannon Lucid | PTA (U/S 260): | 270:12:13:57Z | 257 6750 | 14 1 1 1 1 | 371112 | MI SOLIN S | 1 | (DOUBLE MODULE) | docking). |
| | | (Flt 5 - STS-51-G, STS-34, | 4:46 4:48 | AVE DDV DEGEL | 1000 | 4000 | | | | ÒDS | EVENTO |
| | | STS-43, STS-58, Ascent on STS-76, on-orbit stay | PTM (U/S 260): | AVE BRK DECEL: 3.1FPS/S | 11. 12.12 | | | | | MIDDECK: | EVENTS: - Shannon Lucid was carried to Mir 21 on STS-76 and was |
| | | on Mir 21 and Mir 22) P455/R65/V45/F6 | 5:20 5:24 | | 15 1 10 11 | | | | | SAREX | replaced on Mir 22 by John Blaha on this flight. |
| | | P455/R65/V45/F6 | DROOP (BYD): | WHEELS STOP: | | | Table | 51 | 200 | IMAX | - Shannon Lucid's total flight time: 188:04:00:09 and total Mir time: |
| | | | | 270:12:14:34Z 11788 FT | Market. | | - | | | MSX CPCG | 178:22:23:45. Docking complete at 263:03:21:207, 2:18:26:21 MET |
| | | | | | | | SEX | 图 智 == | 4 | MGM | - Docking complete at 263:03:21:20Z, 2:18:26:31 MET. - Transferred 2025 lbm H ₂ O, 69 lbm O ₂ , and 43 lbm N ₂ to Mir. |
| | | | MECO CMD: 8:33 8:34.6 | ROLLOUT: 10981 FT | | | | The second second | | SAMS | - At 3:02:11 MET, Shannon Lucid transferred to STS-79 and |
| | | MCC WHITE FCR (9) | | 10981 FT 81 SEC | of murry | X | Test | 31 | | CGBA MGBX | John Blaha transferred to Mir-22 crew. (263:11:05:49Z) - Undocking at 268:01:31:29Z, 07:16:36:40 MET. |
| | | FLIGHT DIRECTORS: | <u>VI</u> . | UT JEC | 100 | | | | | INIODA | - Onworking at 200.01.31.272, 07.10.30.40 IVIL 1. |
| | | ASC - R. D. Jackson | | WINDS: | 100 | STATE OF THE PARTY OF | | | | 5 CRYO TK SETS | RADIATOR DEPLOY #19: |
| | | ENT- L. J. Ham LD/O 1 - P. F. Dye | UIVIJ-Z. | H4, L3 KTS OFFICIAL: 1206P09 | NIMOO 4 | 27 022 | СТ | 2 70 Atlantic | _ | 4 GN₂ TANKS | - Both port and starboard radiators were deployed for cooling and to conserve water for transfer to Mir. |
| | | | 42:50.9 42:50.9 75.9 FPS 75.9 FPS | H5, L3 | | | | S-79 Atlantis | 5 | NO RMS | - Transferred 20 CWC's with 2025 lbs water. |
| | | PLNG - W. D. Reeves | 00:47 00:47 | · | as seen | on appr | oach t | o MIR. | | | |
| | | MOD - A. L. Briscoe | | | | | | | | | Continued |

| | | | SI | PACE SH | UTTLE | MIS | SSIO | NS SU | IMN | IARY | Page 2-96 - STS-79 |
|---------------------|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|------|-------|------------|--------------------------|---|
| FLT | ORBITER | CREW (6) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFIC:T ANOMALIES, ETC.) |
| STS-79 Continued | | | | Continued | o c | | | | | | Continued |
| | | | | DENS ALT: 1084 FT | | | | | 99 | | SIGNIFICANT ANOMALIES: - RH RSRM nozzle erosion beginning in throat ring and extending aft into forward exit cone (approx 60 longitudinal erosion areas up |
| | | | | 10:03:18:24 S/T: 641:13:48:49 | | | A C | | | | aft into forward exit cone (approx 60 longitudinal erosion areas up to 0.4 inch diameter). - Supply water tank B quantity transducer dropouts. - Fuel cell O₂ flow transducer degraded. |
| | | | | OV-104: 120:16:54:18 | | | | | | | Cryo H₂ tank 3 B heater failure. Single string GPS erroneous time reference, loss of lock and runaway. (Firmware problem.) |
| | | Tana - J | | DISTANCE: 3,900,000 sm | | | | | | | - TCS range discrepancy APU 2 underspeed shutdown at 13:14 MET. Two-APU entry/landing. |

STS079-349-022 --- Inflight crew portrait, in Mir: Front row, left to right, Aleksandr Y. Kaleri/MIR, Apt, Blaha, Readdy, & Lucid. Back row, left to right, Akers, Walz, Valeri G. Korzun/MIR, Wilcutt.

- ICS range discrepancy.
 APU 2 underspeed shutdown at 13:14 MET. Two-APU entry/landing.
 APU 2 fuel pump seal cavity drain line pressure decay to vacuum.



S79e5131 --- Mir Changeout: Lucid (left) comes down after 6 mos visit, Blaha stays up.



STS079-S-097-- Left to right, PLT Wilcutt, Lucid/MS, & CDR Readdy on aft flight deck for undocking. Lucid looking to come home.



STS079-810-028 --- Russia's Mir Space Station as seen after undocking.

| | SPACE SHUTTLE IVISSIONS SUIVIVIARY Page 2-97 - \$15-80 | | | | | | | | | | | | |
|--|--|--|--|--|-----------------------|---------------------|-------------|-----------------------------|-------|--|--|--|--|
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | | | |
| | | (5) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS | | |
| FLT | ORBITER | (-) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | INIO | 114/115 | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, | | |
| NO. | | TITLE, NAMES | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION. | THROTTLE PROFILE | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) | | |
| | | & EVA'S | ADORT HIVILS | WINDS | ENG. S.N. | LI | | | | LAFERIIVILIVIS | TIRSTS, SIGNII ICANT ANOMALIES, ETC.) | | |
| STS-80 | OV-102 | CDR: | KSC PAD 39B | KSC 33 (KSC 33) 342:11:49:04Z | 104/104/ | BI-084 | | DIRECT | OI-25 | CARGO: | KSC W/D: OPF 80, VAB 6, PAD 33 = 119 days total. | | |
| | (Flight 21 | Kenneth D. Cockrell (Flt 3 - STS-56, STS-69) | 324:19:55:46.95Z | 342:11:49:04Z 6:49:04 AM EST | 109% | RSRM | (42) | INSERTION | (2) | 31111 LBS | LAUNCH POSTPONEMENTS: | | |
| SEQ FLT #80 | Columbia | P456/R159/V121/M140 | 2:53:00 PM EST (P) 2:55:47 PM EST (A) | | PREDICTED: | 49 | | POST OMS-2: | | PAYLOAD_ | - Baselined launch date of 11/7/96 on 7/14/95. | | |
| 1 1 #00 | EDO 9 | | Tuesday 10 | Saturday 17 12/7/96 (8) | 100/104/104/ | | | POST OMS-2: 190 X 188 NM | | CHARGEABLE: 21208 LBS | - Advanced launch date to 10/31/96 on 4/23/96. | | |
| KSC-80 | OMS PODS: | PLT: Kent V. Rominger | 11/19/96 (11) | DEORBIT BURN: | 67/104 | ET-80 | | | | | - Postponed launch date to 11/8/96 on 9/20/96 to analyze implications of STS-79 RH SRM nozzle erosion Postponed launch date to 11/15/96 to allow Thiokol time to | | |
| PAD | LPO5-10 | (Flt 2 - STS-73) | LAUNCH WINDOW: | 342:10:48:02Z | ACTUAL: | LWT 73 | | | | <u>DPLY/RETRIEVE:</u> 12524 / 12427 LBS | - Postponed launch date to 11/15/96 to allow Thiokol time to complete SRM analysis. | | |
| 39B-35 | RPO1-25 | P457/R200/V131/M174 | 2H30M CTOB | XRANGE: 72 NM | 100/104/104/ | F-F | | | | NON-DEPLOYED: | LAUNCH SCRUBS: | | |
| MLP-3 | FRC2-21 | M/S 1 (EV1): | FOM PLS: KSC | ORBIT DIR: DL 37 | 67/104 | <u>et</u> Pred | | | | 7575 LBS | - Scrubbed 11/15/96 launch date after L-2 MMT on 11/13/96 | | |
| IVILP-3 | | Tamara E. Jernigan | EOM PLS: KSC TAL: BEN | | 1 = 2032 (5) | RPT: | | | | MIDDECK: | due to forecast of high surface winds at KSC from 11/15/96 through 11/18/96. New launch date of 11/19/96. | | |
| | | (Flt 4 - STS-40, STS-52, STS-67) | TAL WX: MRN | <u>aim PT</u> : Nominal | 2 = 2026 (6) | 271.3K | | | | MIDDECK: 1109 LBS | , v | | |
| | | P458/R130/V83/F14 | SELECTED: | MLGTD: 3068 FT | 3 = 2029 (14) | ET | | | | SHUTTLE | LAUNCH DELAYS: - Launch delayed 2M47S at T-31 secs while measuring H2 gas in | | |
| | | | RTLS: KSC15/N/N | 342:11:49:04Z VEL: 210 KGS | M 3 EOM: | <u>ET</u> BRKUP: | | | | <u>ACCUMUL</u> ATED | aft compartment per preplanned procedure to confirm <600 ppm. | | |
| | | M/S 2 (EV2): Thomas D. Jones | TAL: BEN36/N/N AOA: EDW22/N/N | 203 KEAS HDOT: -1.0 FPS | WEIGHT: 227815 LBS | 214K | | DEORBIT: | | WEIGHTS: DEPLOYED: | TAL WX: | | |
| | | (Flt 3 - STS-59, STS-68) | PLS: EDW22/N/N | TD NORM 205: | X CG: | <u>ET</u> | | 203 X 169 NM | | 822995 LBS | - Ben Guerir (prime and selected) was forecast and observed GO. Moron was forecast and observed NO-GO for 300 ft overcast. | | |
| COCKRE | ELL A | P459/R177/V111/M155 | TDEL | 3063 F I | 1079.10 | IMPACT | | VELOCITY: | | NON-DEPLOYED: 1137975 LBS | Banjul was not available. | | |
| A STATE OF THE STA | | M/S 3: | <u>TDEL</u> : -0.04 -0.238/-0.2 | DRAG CHUTE | LANDING: | 1:22:40 MET | | VELOCITY: 25877 FPS | | CARGO TOTAL: | DOLILU-II I-LOADS: | | |
| | | F. Story Musgrave | | DRAG CHUTE DEPLOY: 193 KEAS | WEIGHT: | LAT: | | | | 2402314 LBS | - DOLILU-II uplink #12, I-Load uplink #30. | | |
| | | (Flt 6 - STS-6, STS 51-F, STS-33, STS-44, STS-61) | MAX Q NAV: 717 719 | 342:11:49:08Z | 227670 LBS X CG: | 15.5°N LONG: | | ENTRY RANGE: | | PERFORMANCE | FLIGHT DURATION CHANGES: - Extended a day for science, then changed to original landing day due to weather at KSC. Waved off landing at KSC on orbits 248 and 249 (broken ceiling). Waved off landing on orbits 264 | | |
| | | P460/R15/V19/M15 | /1/ /17 | NLGTD: 7100 FT 342:11:49:17Z | 1080.62 | 159.6°W | | 4346 NM | | MARGINS (LBS): FPR: 3100 | - Extended a day for science, then changed to original landing | | |
| | | T / h F\/A/l d h | SRB STG: | VEL: 149 KGS HDOT: -5.5 FPS | | | | | | FPR: 3100 FUEL BIAS: 884 FINAL TDDP: 486 | 248 and 249 (broken ceiling). Waved off landing on orbits 264 | | |
| IGAN JOA | NES | Two 6-hour EVA's planned by Jernigan (EV1) and Jones | 2:04.3 ~2:05 | | | | | | | TINAL IDDI. 400 | and 265 due to forecast and observed ground fog. Total extension of 2 days. | | |
| | | (EV2) for EDFT. EVA's were | <u>PERF</u> : NOMINAL | BRK INIT: 121 KGS | | | | | | PAYLOADS: | - | | |
| | | canceled when crew could not get "B" hatch open. | 2 ENG TAL (BEN): | DRAG CHUTE JETTISON: | *** | * * * | | 17 20 100 | | PI B: | RENDEZVOUS #33: Rendezvous, deploy, grapple, berth and return ORFEUS-SPAS. | | |
| | | not get b natch open. | 3:03 3:03 | 54 KGS | 34 / ** | **** | * | | Y | ORFEUS-SPAS | RENDEZVOUS #34: Rendezvous, deploy, grapple, berth and | | |
| STS080- | 310-028 | MCC WHITE FCR (10) | NEC DETUDN | 342:11:49:40Z | | **** | * STE | 96 | | (Astronomical observations) | return WSF-3. | | |
| - Musgra | | FLIGHT DIRECTORS: | NEG RETURN: 3:58 3:59 | BRK DECEL FPS ² : AVE 5.1 PK 7.6 | | O TORREST | 515 | | | WSF-3 | FIRSTS/LASTS: | | |
| | | A/E - N. W. Hale | | WHEELS STOP: | | 1 | | | | (Epitaxial semiconductor) | First flight with two free-flyers (ORFEUS-SPAS and WSF) and orbiter in constrained motion. | | |
| Shield Fa | | LD/O 2 - G. A. Pennington O 1 - R. M. Kelso | PTA (U/S 304): 4:55 4:51 | 342:11:50:137 | 19 | - | | 0 1 | | SEM ' | EVENTS: | | |
| during fre | | O 3 - J. P. Shannon | | 11789 FT | = 1 | 199 | Hale | | | MIDDECK: | - ORFEUS-SPAS deployed by RMS at 325:04:10:50Z, | | |
| mode wit | n 600mm | O 4 - B. P. Austin | DROOP (BYD): | ROLLOUT: 8721 FT | -0.5 | | | | 1 | PARE/NIH-R CMIX | 100.1E.02 MET | | |
| camera. | | MOD - J. W. Bantle | 5:28 5:28 | 69 SEC | | | | 1 / | | VIEW-CPL | 08-15.03 MET SEP 1 maneuver at 325:04:11:48Z, SEP 2 at 325:04:44:11Z WSF-3 deployed by RMS at 328:01:37:40Z, 03:05:41:53 MET WSF-3 grappled, berthed at 331:02:33:51Z, 06:06:38:04 MET Crew attempted opening "B" hatch at 334:02:30Z, 09:06:34 MET. Being unsuccessful, the two EVA's were canceled ORFEUS-SPAS grappled at 339:08:25:47Z; berthed at 320:130:147 | | |
| 200 | III 30 | | PTM (U/S 304): | WINDS: | | | | | 4 | CCM-A, BRIC, MSX | - WSF-3 grappled, berthed at 331:02:33:51Z, 06:06:38:04 MET. | | |
| The same of | 1 | | 5:57 5:55 | 2T, 4L KTS OFFICIAL: 2006P9 | | | | | | 5 CRYO TK SETS | MET. Being unsuccessful, the two EVA's were canceled. | | |
| 1 | The state of the s | | MECO CMD: | 4T, 4L | ER | | | | | + 4 EDO & 5 N2 TANKS | - ORFEUS-SPAS grappled at 339:08:25:47Z; berthed at | | |
| 5 17 | The same | | 8:29.9 8:30.4 | <u>DENS ALT</u> : | 1 | | 15 | | , | | 339:13:03:41Z. | | |
| 13 | | .47 | \/I+ | 522 F I | | | | | de | EDO PALLET | SIGNIFICANT ANOMALIES: - Loss of LMG down indications. | | |
| | | | 25 922 25915 | FLT DURATION: 17:15:53:17 | | | | | | RMS 46 (S.N. 202)) | Crew unable to unlatch and open "B" hatch (outer airlock). Crew able to turn handle only 30 degrees. Resulted in cancellation of two EVA's. Found screw backed out | | |
| 1 | ALC: NO | 1000 | | S/T: 659:05:42:06 | | | | deck inflight o | crew | (S.N. 202)) RMS used for | cancellation of two EVA's. Found screw backed out | | |
| | 11/2 | The same of | OMS-2: 40:24 40:24 | | | | | o right, CDR | | OKLEDO-OLAO DE- | and in latch actuator planetary gears Window W8 impact damage. | | |
| | | | 279 FPS 279 FPS | <u>OV-102:</u> 217:16:58:27 | | | | & PLT Romin | ger. | and war deploy, | - Window W8 impact damage. - IMU_1 BITE annunciations (deselected from selection filter for | | |
| 7 | | | | | Front row Musarave | | ivio (le | It) & | | grapple & berth and EDFT-05 | entry.) | | |
| | | Market State | | <u>DISTANCE</u> : 7,043,950 sm | Musurave | /IVIO. | | | | EDI 1-03 | - EV2´ helmet difficult to latch. | | |

| | | | ARI | Page 2-98 - 515-81 | | | | | | | |
|--|--|--|--|--|------------------------------|--------------------------|---------------------|---------------------------------|------|------------------------------|---|
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
| FLT | ORBITER | (7) | LAUNCH SITE, LIFTOFF TIME, | RUNWAY, CROSSRANGE | NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS |
| | URBITER | 6 UP / 6 DOWN | | | | | | | FSW | | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, | THROTTLE PROFILE | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | & EVA'S | ADURT TIMES | WINDS | ENG. S.N. | EI | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-81 | OV-104 | CDR: | KSC PAD 39B | KSC 33 (KSC 34) | 104/104/ | BI-082 | 51.67 | DIRECT | | CARGO: | KSC W/D: OPF 62, VAB 5, PAD 24 = 91 days total. |
| | (Flight 18) Atlantis | Michael A. Baker (Flt 4 - STS-43, STS-52, | 12:09:27:23Z | KSC 33 (KSC 34) 22:14:22:44Z 9:22:44 AM EST | 109% | RSRM | (6) | INSERTION | (3) | 28149 LBS | LAUNCH POSTPONEMENTS: |
| SEQ FLT #81 | Aliantis | STS-68) | 4:27:23 AM EST (P) 4:27:23 AM EST (A) | Wednesday 9 | PREDICTED: | 54 | | POST OMS-2: | | PAYLOAD | - Baselined 12/5/96 as launch date on 9/1/95. |
| | Spacehab 6 | P461/R133/V81/M118 | Sunday 10 | 1/22/97 (7) | 100/104/104/ | ET 00 | | 159.9 X 84.9 | | CHARGEABLE: | - Postponed launch date to 1/16/97 on 8/1/96 (SRM heat effects |
| KSC-81 | OMS PODS: | PLT: | 1/12/97 (9) | DEORBIT BURN | 67/104 | ET-83 | | NM | | 19321 LBS | and nozzle erosion on STS-79 and STS-80). - Advanced launch date to 1/12/97 on 9/5/96. |
| PAD | LPO3-22 | Brent W. Jett, Jr. | LAUNCH WINDOW: | <u>DEORBIT BURN</u> : 22:13:17:33Z | ACTUAL: | LWT | | <u>NC5</u> : 14:09:10:43Z | | DEPLOYED: | |
| 39B-36 | RPO4-18 FRC4-18 | (Flt 2 - STS-72) P462/R206/V132/M179 | 6M59S. Mir planar/ phase window and | XRANGE: 34 NM | 100/104/ 70/104 | 76 | | 14:09:10:43Z 209.7 X 142.4 | | 4019 LBS | <u>LAUNCH SCRUBS</u> : None |
| MLP-2 | 11104-10 | | ET heating constraint | ORBIT DIR: DL 38 | | <u>ET</u> | | NM | | NON-DEPLOYED: | LAUNCH DELAYS: None |
| | | M/S 1: | FOM DLC: KCC | | 1 = 2041 (2) 2 = 2034 (8) | PRED | | NO(| | 14492 LBS | |
| | | Peter J. K. (Jeff) Wisoff (Flt 3 - STS-57, STS-68) | EOM PLS: KSC TAL: ZZA | AIM PT: NOMINAL | 3 = 2034 (8) 3 = 2042 (3) | RPT: 271.3K | | <u>NC6</u> : 14:23:41:15Z | | MIDDECK: | TAL WX: - Zaragoza was prime but NO-GO due to forecast overcast 500 |
| Organia de la compansión de la compansió | SIGER | P463/R166/V110/M145 | TAL WX: MRN | MLG1D: 2926 F1 22:14:22:44Z | | | | 209.9 X 201.6 | | 810 LBS | - Zaragoza was prime but NO-GO due to forecast overcast 500 feet and observed broken 300 feet. Moron was selected. Moron |
| | | M/S 2: | SELECTED: | MLGTD: 2926 FT 22:14:22:44Z VEL: 199 KGS 195 KEAS | M 3 EOM: | <u>ET</u> BRKUP: | | NM | | <u>SHUTTLE</u> | and Ben Guerir were forecast and observed GO. |
| | | John M. Grunsfeld | IRTES: KSC15/IV/IV | HDOT: -1.4 FPS | WEIGHT: | 214K | | BRAKING: | | ACCUMULATED | DOLILU-II I-LOADS: |
| 1 | | (Flt 2 - STS-67) P464/R191/V133/M167 | TAL: BEN36/N/N AOA: EDW22/N/N | TD NORM 195: | 215403 LBS X CG: | FT | | 15:02:38:46Z 209.5 X 208.9 | | WEIGHTS: DEPLOYED: | - DOLILU-II uplink #12, I-Load uplink #31 |
| 6 | en | | PLS: EDW22/N/N | 2961 FT | 1081.41 | <u>ET</u> IMPACT | | NM | | 827014 LBS | SHUTTLE NIGHT LAUNCH #15 |
| | | M/S 3: Marsha S. Ivins | TDEL. | DRAG CHUTE DEPLOY: 187 KEAS | I ANDING. | 1:26:53 | | CED. | | NON-DEPLOYED: 1153277 LBS | FLICHT DUDATION CHANCES. |
| MCC WHI | ΓE FCR (11) | (Flt 4 - STS-32, STS-46, | TDEL: -0.04 -0.238/-0.2 | 22:14:22:55Z | <u>LANDING</u> : WEIGHT: | MET LAT: | | <u>SEP</u> : 20:04:01:40Z | | CARGO TOTAL: | FLIGHT DURATION CHANGES: - Waved off landing at KSC on orbit 161 due to forecast of broken |
| FLIGHT DI | RECTORS: | STS-62) | | NLGTD: 6377 FT | 215337 LBS | <u>LAT</u> : 0.38°S | | 212.7 X 203.2 | | 2430463 LBS | 4000 foot ceiling. |
| ASC - R. D ENT - L. J. | | P465/R109/V77/F12 | MAX Q NAV: 717 PSF 719 PSF | 22:14:22:55Z VEL: 144 KGS | X CG: 1083.11 | <u>LONG</u> : 125.6°W | | NM | | PERFORMANCE | - Flight duration extended one orbit. |
| LD/O 1 - W | I. D. Reeves | <u>M/S 4</u> : | | 136 KEAS HDOT: -6.5 FPS | 1003.11 | 123.0 W | | DEORBIT: | | MARGINS (LBS): | EVENTS: |
| 02-P.F. | Dye L. Engelauf | Ascent Jerry M. Linenger | SRB STG: 2:04.3 2:05 | | | | | 207.5 X 181.9 NM | | FPR: 3100 FUEL BIAS: 884 | - Mir capture at 15:03:54:49Z, 2:18:27:26 MET. - Docking at 15:04:02:28Z, 2:18:35:05 MET. |
| MOD - R. E | E. Castle | (Flt 2 - STS-64, stay on | | BRK INIT: 79 KGS | | | | VELOCITY: 25891 FPS | | FINAL TDDP: 1285 | - Blaha transferred to STS-81/Atlantis and Linenger transferred to |
| | | Mir 22, and return on | <u>PERF</u> : NOMINAL | DRAG CHUTE JETTISON: | | | | 25891 FPS ENTRY | | RECON: 2117 | Mir 22 at 3:00:17:00 MET. |
| | | STS-84) P466/R182/V134/M159 | 2 ENG TAL (BEN): | 56 KGS 22:14:23:26Z | | | | RANGE: | | PAYLOADS: | - Blaha total flight time 127:05:27:55 and Mir time 116:22:38:34. - Hatch closure at 07:03:19 MET and undocking at 20:02:15:23Z, |
| | | | 3:03 3:03 | BRK DECELFPS ² | | | | RANGE: 4428 NM | | PLB: ODS | 07:16:48:00 MET. |
| | | M/S 4: Descent | NEG RETURN: | AVE 4.0 PK 7.7 | STS081-36 | 9-003 | - Inflight | crew portrait o | of | ODS | RENDEZVOUS #35: Rendezvous and dock with Mir (fifth |
| | | John E. Blaha | 3:58 3:59 | WHEELS STOP: 22:14:23:51Z | Mir-22 & S | TS-81 cr | ews. Fr | ont: It to rt, ST | S- | SHUTTLE-MIR | docking). |
| | | (Flt 5 - STS-29, STS-33, STS-43, STS-58, Ascent | PTA (U/S 304): | 22:14:23:51Z 12276 FT | | | | MS, Aleksandr | | MISSION 5 | SIGNIFICANT ANOMALIES: |
| STS081- | 328-013 | on STS-79, and stay on | 4:55 4:51 | ROLLOUT: | Kaleri/FE/M | /lir-22. IV orzun ly | liddle ro ins/MS | w: Mir-22 CDR & Blaha/Mir-22 | 2 | SPACEHAB | - Fuel Cell 1 voltage erratic below MNA voltage Fuel Cell 2 cell performance monitor self test anomaly. |
| Mir as se | | Mir 22) P467/R97/V48/M88 | DROOP (ZZA): | 9350 FT 67 SEC | | | | IS & current gu | | DOUBLE MODULE | - Fuel Cell 2 cell performance monitor self test anomaly OCA video conference VLHS cable adapter failure. |
| Atlantis. | | 1 407/107/1040/10100 | 5:23 5:24 | | researcher | , Wisoff/I | νs, & P | LT Jett. | | MIDDECK: | - LiOH door latch jammed closed. |
| | | | DTM /LI/C 204). | WINDS: 41, 1R KTS | | *** | | 1 | (Co | CREAM | - EVA protect mode command fails when used in TEC (capability |
| | HREE TANK | | PTM (U/S 304): 5:57 5:55 | OFFICIAL: 1404P6 4T, 1R | | | | 14 | | KIDSAT SAMS | not in software). - VIU S.N. 1025 failure. |
| | U.S. | | | i . | ta o Panel N | | | | | | - IMU3 exhibited large X and Y gyro drift rates. Took to standby. |
| | The state of the s | Jacon and a second seco | MECO CMD: 8:29.9 8:30.4 | DENS ALT: 86 FT | | Total 1 | 1 | | | 5 CRYO TK SETS | |
| The state of the s | | | 0.50.4 | <u>FLT DURATION</u> : 10:04:55:21 | | | | | | 5 CRYO TK SETS 4 N2 TANKS | |
| | | | <u>VI</u> : 25922 25915 | <u>S/T</u> : 669:10:37:27 | 7 | | | | | | |
| 1 | Manager of the Control of the Contro | | | | | | | | | NO RMS | |
| | 4 | | OMS-2: 40:25 40:24 | OV-104: 130:21:49:39 | | 12/1 | 1 | 100000 | N. V | | |
| 1000 | | | 40:25 40:24 279 FPS 279 FPS | DISTANCE: 3,900,000 sm | 300 | 1 | | | 1130 | | |
| | | | 1 2 2,,,,,0 | 3,900,000 sm | | | | | | | |

| SPACE SHUTTLE IVIISSIONS SUIVIIVIAR T | | | | | | | | | | | | |
|--|--|--|--|---|--|---------------|---------------|---|--------------|--|--|--|
| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, | |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) | |
| STS-82 SEQ FLT #82 KSC-82 PAD 39A-46 MLP-1 | OV-103 (Flight 22) Discovery OMS PODS: LPO1-25 RPO3-23 FRC3-22 | | KSC 39A 42:08:55:16.98Z 3:55:17 AM EST (P) 3:55:17 AM EST (A) Tuesday 11 2/11/97 (6) LAUNCH WINDOW: TH6M30S HST PLANAR/ PHASE WINDOW EOM PLS: KSC TAL: BEN TAL WX: NONE SELECTED: RTLS: KSC 15/N/N TAL: NONE AOA: KSC 15/N/N PLS: KSC 22/N/N TDEL: -0.01 0.312/0.35 | FLT DURATION, WINDS KSC 15 (KSC 35) 52:08:32:24Z 3:32:24 AM EST Friday 9 2/21/97 (4) DEORBIT BURN: 52:07:21:55Z XRANGE: 484 NM ORBIT DIR: DL 39 AIM PT: CLOSE IN MLGTD: 2522 FT 52:08:32:24Z VEL: 184 KGS 191 KEAS HDOT: -1.5 FPS TD NORM 195: 2394 FT DRAG CHUTE | PROFILE ENG. S.N. 104/104/ 109% PREDICTED: 100/100/100/ 67/104 ACTUAL: 100/100/100/ 68/104 1 = 2037 (3) 2 = 2040 (2) 3 = 2038 (3) M 3 EOM: AVE WEIGHT: 213949 LBS X CG: 1077.83 LANDING: WEIGHT: 213869 LBS | | 28.46 (43) | DIRECT INSERTION POST OMS-2: 312.9 X 186.3 NM FINAL BRAKES: 322.3 X 316.4 NM REBOOST 1: 323.7 X 319.2 NM REBOOST 1A: 325.4 X 320.0 NM REBOOST 2: 328.9 X 320.5 NM REBOOST 3: 335.1 X 321.0 | O1-25 (4) | | | |
| ATHUR - HIMS | STS-S2 VERSOX + HOR | P472/R125/V88/M112 M/S 4/EV-1: Mark C. Lee (Flt 4 - STS-30, STS-47, STS-64) P473/R100/V78/M91 M/S 5/EV-2: Steven L. Smith (Flt 2 - STS-68) P474/R184/V137/M161 | MAX Q NAV: 745 PSF 754 PSF SRB STG: 2:04.3 2:05 PERF: NOMINAL 2 ENG TAL (BEN): NO CALL NEG RETURN: 4:04 4:05 PTA (U/S 500): 3:56 3:51 DROOP: 5:27 5:25 PTM (U/S 500): 5:14 5:04 MECO CMD: 8:30.1 8:29.8 VI: 26129 26119 OMS-2: 44:29.6 44:33.6 273.8 FPS 276 FPS | DEPLOY: 184 KEAS 52:08:32:27Z NLGTD: 5581 FT 52:08:32:34Z VEL: 136 KGS 140 KEAS HDOT: -6.7 FPS BRK INIT: 94 KGS DRAG CHUTE JETTISON: 52 KGS 52:08:32:56Z BRK DECEL FPS2: AVE 5.2 PK 7.7 WHEELS STOP: 52:08:33:16Z 9588 FT ROLLOUT: 7066 FT 52 SEC WINDS: 5H, 1L KTS OFFICIAL:1407P13 7H, 1L Continued | STS082-E Captured | Ξ-5147 | | DEORBIT: 334.1 X 312.2 NM DEORBIT BURN: 504 FPS VELOCITY: 26120 FPS ENTRY RANGE: 4238 NM | / | PERFORMANCE MARGINS (LBS): FPR: 3100 FUEL BIAS: 884 FINAL TDDP:3503 RECON:4235 PAYLOADS: PLB: Hubble Space Telescope Service Mission 2 (HST SM-02) MIDDECK: MSX 5 CRYO TK SETS + 5 N2 TANKS RMS 47 (S.N. 301) RMS USED FOR HST CAPTURE, BERTH, & DEPLOY | Extended flight duration 1 rev. SHUTTLE NIGHT LANDING #9 FIRSTS/LASTS: - First night landing at KSC with centerline lights. EVENTS: - HST grapple at 1:23:38 MET - Space Shuttle altitude record 335.1 NM X 321.0 NM after Reboost 3 maneuver. RENDEZVOUS #36: - Rendezvous, grapple, service, reboost, and release of HST. HST REBOOST MANEUVERS: - Reboost 1 was 20M43S at 04:01:09:28 MET Reboost 1 was 10M13S at 04:06:07:02 MET with delta V 33 FPS. Maneuver was to avoid a conjunction with Pegasus debris Reboost 2 was 19M47S at 05:01:15:00 MET Reboost 3 was 31M54S at 07:01:32:58 MET. SIGNIFICANT ANOMALIES: - HST + V2 solar array rapid slew during airlock depress. For subsequent airlock depresses, one equalization valve on each hatch was duct-taped to limit air flow EMU gloves had yellow smudges from HST handrails FES feedline A accumulator heater failure Erratic supply water tank D transducer. | |

| | | | SI | PACE SH | UIILE | | SIONS SU | JIVIIV | IARY | Page 2-100 - STS-82 |
|---------------------|---------|--|--|--|---|-----------------------------------|--|---------------------|---|---|
| FLT NO. | ORBITER | CREW (7) TITLE, NAMES & EVA'S | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS | SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N. | SRB RSRM AND ET | ORBIT INC HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFIC:T ANOMALIES, ETC.) |
| STS-82 Continued | | Continued | | Continued DENS ALT: 926 FT FLT DURATION: 9:23:37:07 S/T: 679:10:14:34 OV-103: 155:23:27:01 DISTANCE: 3,800,000 sm | pay tribute to rt),Tanne | to the Hi er/MS, Lo wley/MS | Crew portrait: Bot ST and ground suger/MS & Harbaugh S, CDR Bowersox C | pport te h/MS. I | eam. Front (It Behind them | SIGNIFICANT ANOMALIES (CONTINUED: - Fuel cell 3 water flow through alternate path causing concern that H ₂ gas would get into EMU's during recharge from tank C Bent pins on SADE-2R P2 harness Three PGSC problems No RSRM erosion found. |
| | | by EV1 and EV2 on 2/17/97 Unscheduled EVA #5 5H17M21Sduration MCC WHITE FCR (12) FLIGHT DIRECTORS: A/E - N. W. Hale LD/O 1 - J. W. Bantle O 2 - B. P. Austin PLNG - C. W. Shaw MOD - A. L. Briscoe | Smith/MS on R | e/PLC inside HS: MS during remove Resolution Spect | val of | Tann | 5407 - Harbaugh/ler/MS on RMS aconnec Sensor (FGS | cessing | Fine | STS081-E-5937 HST begins its separation from Discovery following release. |

| | | | JI. | ACE SHU | ,,,,,,, | IVIIO | | 143 30 | IAIIAI | | o |
|-----------------|--------------------|---|--|---------------------------------------|--------------------------------|--------------------------|--------------|---------------------------|--------|------------------------------------|---|
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
| | | (7) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (*/ | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, WINDS | PROFILE ENG. S.N. | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-83 | OV-102 | CDR: | KSC, PAD 39A | KSC 33 (KSC 36) 98:18:33:11Z | 104/104/ | BI-086 | 28.46 | DIRECT | OI-25 | CARGO: | KSC W/D: OPF 73, VAB 6, PAD = 24, 103 days total. |
| 01000 | (Flight 22) | James D. Halsell, Jr. | 94:19:20:31.98Z | 98:18:33:11Z 2:33:11 PM EDT | 109% | | (44) | INSERTION | (5) | 34373 LBS | |
| SEQ | Columbia | (Flt 3 - STS-65, STS-74) P475R178/V123/M156 | 2:00:00 PM EST (P) 2:20:32 PM EST (A) | | PREDICTED: | RSRM 59 | | POST OMS-2: | | PAYLOAD | LAUNCH POSTPONEMENTS: - Baselined 3/27/97 as launch date on 12/14/95. |
| FLT #83 | 20th | 1 4751(170/ V 125/1V1150 | Friday 16 | Tuesday 12 4/8/97 (10) | 100/104/104/ | 37 | | 163.5 X 160.1 | | CHARGEABLE: | - Postponed launch date to 4/3/97 on 1/16/97 |
| KSC - 83 | Spacelab | PLT: | 4/4/97 (12) | | 67/104 | ET-84 | | NM | | 25556 LBS | · · |
| DAD | Flight | Susan L. Still P476/R218/F28 | LAUNCH WINDOW: | <u>DEORBIT BURN</u> : 98:17:31:18Z | ACTUAL: | LWT-77 ET | | | | DEPLOYED: | LAUNCH SCRUBS: - Scrubbed 4/3/97 launch on 4/1/97 at approximately L-42 hours |
| PAD 39A - 47 | LM-14 | | 2H30M CTOB | | 100/104/104/ | PRED | | | | NONE | based on decision to add missing insulation blankets to water |
| | EDO 10 | M/S 1 (PAYLOAD CDR): | FOM DLC VCC | XRANGE: 56 NM | 67/104 | RPT: | | | | NON DEDLOVED | coolant lines on 576 bulkhead. |
| MLP - 3 | EDO 10 | Janice E. Voss (Flt 3 - STS-57, STS-63) | EOM PLS: KSC TAL: BYD | ORBIT DIR: DL 40 | 1 = 2012 (19) 2 = 2109 (17) | 271.3K | | | | NON-DEPLOYED: 23536 LBS | LAUNCH DELAYS: |
| | OMS PODS: | P477/R167/V115/F22 | | <u>aim Pt</u> : Nominal | 3 = 2019 (17) | <u>ET</u> BRKUP: | | | | 20000 200 | - Launch delayed 20M32S during T-9 minute hold because the cabin pressurization probe nose seal was found damaged and |
| | LPO5-11 RPO5-10 | M/C 2. | CELECTED. | MLGTD: 3127 FT | M 2 FOM. | BRKUP: 214K | | DEORBIT: | | MIDDECK: 2020 LBS | cabin pressurization probe nose seal was found damaged and |
| | FRC2-22 | M/S 2: Michael L. Gernhardt | JLLLCTLD. | 98.18.33.117 | M 3 EOM: WEIGHT: | 214K | | 162.7 X 158.3 NM | | | was replaced. Followed by high O₂ reading in mid-body caused by cabin vent into PLB. |
| | 1.1.02 22 | (Flt 2 - STS-69) | TAL: BYD 32/N/N | VEL: 193 KGS 197 KEAS | 235510 LBS | <u>ET</u> | | | | SHUTTLE | , |
| | VOSC | P478/R199/V138/M173 | AOA: KSC 15/N/N PLS: FD1 NONE | HDOT: -1.3 FPS | X CG: 1078.45 | <u>IMPACT</u> 1:21:10 | | VELOCITY: 25791 FPS | | ACCUMULATED WEIGHTS: | TAL WX: - Banjul (prime and selected) and Moron were forecast and |
| THOMA | | M/S 3: | FD2 DELAY PRESS | TD NORM 205: | 1076.43 | MET | | 20/91 FP3 | | | observed GO. Ben Guerir was forecast NO-GO for crosswinds |
| 5 | | Donald A. Thomas | 12 SECONDS | 2553 FT | LANDING: | <u>LAT</u> : 13.68°N | | ENTRY RANGE: | | 833955 LBS | but observed GO. |
| HAR S | E | (Flt 3 - STS-65, STS-70) P479/R180/V119/M158 | TDEL: | DRAG CHUTE DEPLOY: 186 KEAS | WEIGHT: 235421 LBS | 13.68°N <u>LONG</u> : | | <u>RANGE</u> : 4402 NM | | NON-DEPLOYED: 1189266 LBS | DOLILU-II I-LOADS: |
| NE NE | MSI 🗒 | 1 47 7/10/10/10/10/10/10/10/10/10 | 0.01 0.012/0.05 | 98:18:33:15Z | X CG: | 163.15° | | 4402 INIVI | | | - DOLILU-II uplink #16, I-Load uplink #33. |
| Ca | 1 | <u>P/S 1</u> : | | <u>NLGTD</u> : 6654 FT | 1079.99 | W | | | | CARGO TOTAL: 2489727 LBS | ' ' |
| OUCH | 83 LINTER | Roger Crouch P480/R219/M191 | MAX Q NAV: 709 708 | 98:18:33:23Z | S. V. | 270 | The same | | | PERFORMANCE | FLIGHT DURATION CHANGES: - Planned NEOM was on orbit 251. A Minimum Duration Flight |
| 10000 | | 1 | | VEL: 145 KGS 151 KEAS | 1100 | P. 993 | The same | | 1 | MARGINS (LBS): | (MDF) was declared due to concern about fuel cell 2 substack 3 |
| | | P/S 2: | SRB STG: 2:03.5 2:03 | HDOT: -5.8 FPS | | | | 1 | | FPR: 3100 | increasing delta volts. Landing occurred on orbit 64 (11 days and 11 orbits early). |
| | | Gregory T. Linteris P481/R220/M192 | 2:03.5 2:03 | BRK INIT: 85 KGS | | | | | Pu | FUEL BIAS: 884 FINAL TDDP: 4820 | and 11 orbits earry). |
| | | | PERF: NOMINAL | DRAG CHUTE | | | 400 | 0 | 10 | RECON: 3741 | FIRSTS/LASTS: |
| | | MCC WHITE FCR (13) FLIGHT DIRECTORS: | 2 ENG TAL (BYD): | JETTISON: 57 KGS | | 120 | | 1 | A | PAYLOADS: | First U.S. spaceflight with female flight director for ascent (Linda Ham). |
| | | A/E - L. J. Ham | 2:40 2:41 | 98:18:33:48Z | | 100 | | A CUM | 1 | PLB: | (Liliua Halli). |
| | | LD/O 3 - R. M. Kelso | | BRK DECELFPS2: AVE 4.8 PK 6.9 | 070000 | 200,000 | DI T | CALL CLASS | | Microgravity Science | SIGNIFICANT ANOMALIES: - FC2 substack 3 delta volts unusual start up and continuing on- |
| | | O 1 - W. D. Reeves O 2 - G. A. Pennington | <u>NEG RETURN</u> : 3:57 4:00 | | | | | Still floats in | | Laboratory. Protein | FC2 substack 3 delta volts unusual start up and continuing on- orbit trend toward 300 mvolts caused a Minimum Duration Flight |
| | | O 4 - J. P. Shannon | | WHEELS STOP: 98:18:34:11Z | the Space | elad Mod | ule au | ring activation | 1. | Crystallography. | (MDF) to be declared. Postflight analysis indicated trend in |
| | | MOD - J. W. Bantle | PTA (U/S 154): | 11729 FT | 1/2 // | | and the same | | No. | Combustion | multiple cells, not a single cell. |
| | | | 5:21 5:16 | ROLLOUT: | | | 1000 | | | Science, and Materials Sciences | - FC2 H₂ reactant valve failed to close by switch action when shutting down FC2 (regulator vented reactants). Valve closed |
| | | | DROOP (BYD): | 8602 FT 60 SEC | | | - | 0 | All: | (MSL-1/LM) | 6 hours later. |
| S98-16 | | - S//A | 5:29 5:30 | | | - | 1 | | 1 | OARE | Y star tracker bypassed by PASS. |
| In JSC | | = | PTM (U/S 243): | WINDS: H10, R2 OFFICIAL: 0209P18 | .3 | | | 10 | | CRYOFD | Z star tracker pressure fail. - F3F failed off (low PC). |
| Linda H | Iam, | | 5:45 5:45 | H6, R6 | | | | | IF B | MIDDECK: | - Subsystem RAU E transient |
| first fer | nale | | MECO CMD: | DENS ALT: 963 FT | 90 | | | | 1 | SAREX-II MSX | - Multiple ECOS "hang" occurrences. |
| Ascent | Flight | 130 | MECO CMD: 8:29.7 8:30.7 | FLT DURATION: | | MAS | - | | 481 | | |
| Directo | | | \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ | 3:23:12:39 | 77 191 | | | | | 5 CRYO TK SETS + | |
| (Photo | | FIRE | <u>VI</u> : 25877 25871 | <u>S/T</u> : 683:09:27:13 | | | | v portrait in | | 4 EDO 5 N2 TANKS | |
| STS-09 | 100 | | 23077 | | Spacelab. | | | | | | |
| | | 77 | OMS-2: | <u>OV-102:</u> 221:15:11:06 | Voss/MS/ | | | | | EDO PALLET | |
| | | | 39:53 39:54.7 221.6FPS 222 FPS | DISTANCE: | | | | t) Crouch/PS & Linteris/P | | NO RMS | |
| | | | | 1,5 <u>00,000 s</u> m | Gernnard | I/IVIみ. PL | T Still | · α Linteris/P | റ. | | |

| | SPACE SHOTTEL WISSIONS SUMINAR I | | | | | | | | | | | |
|------------|--|--|--|---|----------------------|--------------------------------------|--------|-----------------------------------|------------|---|---|--|
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | | |
| | | (8) 7 UP & 7 DOWN | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS | |
| FLT | ORBITER | (6) 7 OF & 7 DOWN | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, | |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, | |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) | |
| | | | | WINDS | ENG. S.N. | | | | | | | |
| STS-84 | OV-104 | CDR: | KSC, PAD A | KSC 33 (KSC 37) 144:13:27:43Z | 104/104/ | BI-087 | | DIRECT | OI-25 | CARGO: | KSC W/D: OPF 76, VAB 4, PAD 21 = 101 days total. | |
| | (Flight 19) | Charles J. Precourt | 135:08:07:47.9Z | 9:27:43 AM EDT | 109% | DODIA | (7) | INSERTION | (6) | 28497 LBS | LAUNOU DOCTDONEMENTO | |
| SEQ | Atlantis | (Flt 3 - STS-55, STS-71) P482/R161/V118/M141 | 4:07:48 AM EDT (P) 4:07:48 AM EDT (A) | | PREDICTED: | RSRM 60 | | DOST OMS 2: | | PAYLOAD | LAUNCH POSTPONEMENTS: - Baselined 5/1/97 launch date on 1/12/96. | |
| FLT #84 | Spacehab 7 | PLT: | Thursday 24 | Saturday 18 | 100/104/104/ | 00 | | POST OMS-2: 160.6 X 85.5 | | CHARGEABLE: | - Postponed launch date to 5/15/97 on 2/1/96 due to STS-78 | |
| KSC-84 | Орасспар 7 | Eileen M. Collins | 5/15/97 (4) | 5/24/97 (7) | 67/104 | ET-85 | | NM | | 19643 LBS | SRB sooting and heat effects in field joints. | |
| K3C-04 | OMS PODS: | (Flt 2 - STS-63) | ` ' | DEORBIT BURN: | | | | | | | | |
| PAD | LPO3-23 | P483/R188/V139/F24 | LAUNCH WINDOW: | 144:12:23:33Z | ACTUAL: | LWT-78 | | <u>II</u> | | DEPLOYED: 3902 LBS | LAUNCH SCRUBS: | |
| 39A-48 | RPO4-19 | M/S 1 (PAYLOAD CDR): | 7M00S | XRANGE: 34 NM | 100/104/104/ | | | 1:17:11:52 | | 3902 LBS | - None | |
| MIDO | FRC4-19 | Jean-Francois Clervoy (Flt 2 - STS-66) | MIR PLANAR/ PHASE WINDOW | | 67/104 | FT | | MET 215.6 X 203.4 | | NON-DEPLOYED: | LAUNCH DELAYS: | |
| MLP-2 | | ESA Astronaut (France) | THASE WINDOW | ORBIT DIR: DL 41 | 1 = 2032 (6) | PRED | | NM | | 14605 LBS | - None | |
| | | P484/R186/V140/M163 | EOM PLS: KSC | AIM PT: NOMINAL | 2 = 2031 (15) | RPT: | | | | | 1.4 | |
| | | <u>M/S 2</u> : | TAL: ZZA | MLGTD: 2882 FT | 3 = 2029 (15) | 271.3K | | 7:03:48 | | MIDDECK: 1136 LBS | TAL WX: | |
| PRECOURT | 84 COLLINS | Carlos I. Noriega | TAL WX: MRN, BEN | 1///·13·77·//27 | | | | 214.3 X 199.7 | | 1136 LBS | - Zaragoza (prime and selected), Moron, and Ben Guerir All | |
| & WND | ϕ | P485/R221/M193 M/S 3: | SELECTED: | VEL: 208 KGS 196 KEAS | <u>M 3 EOM</u> : | <u>E I</u> BRKUP: | | NM | | <u>SHUTTLE</u> | forecast GO and observed GO. | |
| CLES * * * | A R | Edward T. Lu | SELECTED: RTLS: KSC 33/N/N | HDOT: -1.0 FPS | WEIGHT: | 214K | | 07:08:10:39 | | ACCUMULATED | DOLILU-II I-LOADS: | |
| By 15 | | P486/R222/M194 | ITAL: 77A 30 | | 216168 LBS | 2 | | 214.3 X 199.7 | | WEIGHTS: | - DOLILU-II uplink #15, I-Load uplink #34 | |
| NORIEGA | T KOND | <u>M/S 4</u> : | AOA: KSC 15/N/N PLS: EDW 22/N/SF | <u>TD NORM 195</u> : 2989 FT | X CG: | <u>ET</u> | | NM | | DEPLOYED: | · · | |
| OA. | Lo | Elena V. Kondakova | PLS: EDW 22/N/SF | | 1080.95 | IMPACT | | DEODDIT | | 1205007 LBS | SHUTTLE NIGHT LAUNCH #17 | |
| | | (Russia) P487/R223/F29 | TDEL: | DRAG CHUTE DEPLOY: 183 KEAS | LANDING: | 1:26:42 MET | | <u>DEORBIT</u> : 214.1 X 199.7 | | NON-DEPLOYED: 2042864 LBS | FLIGHT DURATION CHANGES: | |
| MCC WHI | TE FCR (14) | M/S 5: | 0.06 0.142/0.18 | 144:13:27:47Z | WEIGHT: | LAT: | | 214.1 X 199.7 NM | | CARGO TOTAL: | - Waved off landing on orbit 144 due to forecast of 5000 feet | |
| | | Ascent | | | 216021 LBS | 0.95°S | | 14101 | | 2518224 LBS | variable broken and too dynamic. | |
| FLIGHT D | RECTORS: | C. Michael Foale | MAX Q NAV: | NLGTD: 5720 FT 144:13:27:52Z VEL: 175 KGS | X CG: | LONG: | | VELOCITY: | | | - Extended flight one orbit and landed on orbit 145. | |
| A/E - N. W | . наiе . L. Engelauf | (Flt 4 - STS-45, STS-56 & | 725 728 | VEL: 175 KGS | 1082.57 | 128.0°W | | 25906 FPS | | PERFORMANCE | EVENTO | |
| 02-R.E. | . L. Liigeiaui Castle | STS-63, stay on MIR 23, and return on STS-86) | SRB STG: | 156 KEAS | | | | ENTRY | | MARGINS (LBS): FPR: 3100 | EVENTS: | |
| PLNG - P. | | P488/R143/V92/M127 | 2:04.2 2:04 | HDOT: -6.9 FPS | | | | RANGE: | | FUEL BIAS: 884 | - Elena Kondakova's first flight was on Soyuz TM-17. - Mir 23 crew is Commander Vasily Tsibiliyev and Flight Engineer | |
| MOD - A. I | | M/S 6: | 2.01.2 | BRK INIT: 134 KGS | | | | 4397 NM | | FINAL TDDP: 938 | Alexander Lazutkin. | |
| | T | Descent | PERF: NOMINAL | DRAG CHUTE | | | | | | RECON: 868 | Mir capture at MET 1:18:25:36. Hooks closed at MET 1:18:33. | |
| | | Jerry M. Linenger | 2 ENG TAL (DEN) | DRAG CHUTE JETTISON: 53 KGS | | | | | | | - Hatch open at MET 1:20:16. | |
| | | (Flt 2 - STS-64, ascent on STS-81, and stay on Mir | 2 ENG TAL (BEN): 2:32 2:37 | 144:13:28:17Z | | | | | | PAYLOADS: | - Crew transfer time: Foale to Mir 23 and Linenger to STS-84 was 2D6H13M. Linenger stay time on Mir was 122:04:36:25 and total | |
| | | 22 and 23) | 2.32 2.31 | BRK DECEL FPS2: | | | 生物 。 | | 1 | PLB: | flight time was132:04:00:20. | |
| | | P489/R182/V134/M159 | NEG RETURN: | AVE 6.2 PK 9.6 | | STATE OF THE PARTY | | | THE R. | SHUTTLE/MIR | - Transferred equipment, 1038 lbm H ₂ O, 82 lbm O ₂ , and 21 lbm | |
| | | | 4:03 4:05 | WHEELS STOP: | | | 1 (20) | | | MISSION 6 | N ₂ to Mir. | |
| Buss: | a's Mir-post | Atlantia con | DTA (IUC 242). | 144:13:28:36Z | | A. | 1 | | 1 | SPACEHAB | - Hatch closing at MET 6:04:32; undocking at MET 6:15:56. | |
| Kussi | a s wiii-pust i | תומוווס ספף. | PTA (U/S 263): 4:37 4:35 | 11266 FT | 5 11 | ava . | D (00) | 0 | 34/ | DOUBLE MODULE | FIRSTS: | |
| | | | | <u>ROLLOUT</u> : | | | | | The last | 2 JOBEL MODULE | - First EVA by a U.S. astronaut from Mir Space Station to deploy | |
| | , In | | DROOP (ZZA): | 8384 F I 53 SEC | | 7 | 1 | F 7/2 3 | 4 | | - First EVA by a U.S. astronaut from Mir Space Station to deploy optical properties monitor by Linenger and Tsibiliyev. EVA was on 4/29/97. Exit from KVANT-2 airlock in Orlan M suit. Duration | |
| | The same of the sa | | 5:20 5:25 | | - 1/ | 1 | | 14 1 | 4 1 | MIDDECK: | on 4/29/97. Exit from KVANT-2 airlock in Orlan M suit. Duration | |
| | | | PTM (U/S 263): | WINDS: 6T, R6 KTS OFFICIAL: 1109P13 | | | | | 0 | CREAM MSX | 4:57:30. | |
| | | | 6:07 6:07 | 17, R6 | OTCOOL (| 000 045 | 0 | wa franc OZO | 0.4 | SIMPLEX | RENDEZVOUS #37: | |
| | | | 0.07 | · | | | | ws from STS | o-84 | RME-III | - Rendezvous and dock with Mir (sixth docking). | |
| | | | MECO CMD: | DENS ALT: 1316 FT | J | | | hab Double | | EPICS | , , , , | |
| 10 | | | 8:32.1 8:33.4 | FLT DURATION: | | | | or number of | | PCG-STES | SIGNIFICANT ANOMALIES: | |
| | | | VI. | 9:05:19:55 | | | | cecraft. Fron | nt | LME | - GPC Transient Mode Switch - dump indicated it was procedural problem. | |
| | F | | <u>VI</u> : 25873 25870 | <u>S/T</u> : 692:14:47:10 | | | | V. Tsibliyev, | | | - Aft PL MNC amps measurement failed. | |
| | 7 | | | OV-104 ⁻ | | | | azutkin & Fo | ale. | 5 CRYO TK SETS | - GPS/INS and GPS DTO problems. | |
| | | | <u>OMS-2</u> : | <u>OV-104:</u> 140:03:09:34 | | ck, from left: Lu, Collins, Clervoy, | | | 4 N2 TANKS | - Primary VHF and radio interface unit failure. | | |
| | | | 44:01.6 43:04 | | Kondakova & Noriega. | | | | | NO DMC | - Window 1 impact reported by crew. | |
| | | | 75.6 FPS 76 FPS | DISTANCE: 3,600,000 sm | | akova & Nollega. | | | NO RMS | - MS4 lightweight seat entry position/"A" hatch interference. | | |
| | | | 1 | 1 | | | | | | | | |

| | | | | | JIILL | | | 140 00 | | | Ŭ |
|--|---------------------------|--|--|--|---|--------------------------|----------------------|---|-------|--|---|
| FLT NO. | ORBITER | CREW (7) TITLE, NAMES & EVA'S | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS | SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N. | SRB RSRM AND ET | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-94 (STS-83R) SEQ FLT #85 KSC - 85 PAD 39A-49 MLP-1 STS094 Crouch Gernhai NASDA Isotherm Furnace facility. | dt at the Large nal | CDR: James D. Halsell, Jr. (Fit 4 - STS-65, STS-74, & STS-83) P490/R178/V123/M156 PLT: Susan L. Still (Fit 2 - STS-83) P491/R218/V141/F28 M/S 1 (PAYLOAD CDR): Janice E. Voss (Fit 4 - STS-57, STS-63, & STS-83) P482/R167/V115/F22 M/S 2: Michael L. Gernhardt (Fit 3 - STS-69 & STS-83) P493/R199/V138/M173 M/S 3: Donald A. Thomas (Fit 4 STS-65, STS-70, STS-83) P494/R180/V119/M158 P/S 1: Roger Crouch (Fit 2 - STS-83) P496/R219/V142/M191 P/S 2: Gregory T. Linteris (Fit 2 - STS-83) P496/R220/V143/M192 MCC WHITE FCR (15) FLIGHT DIRECTORS: A/E - L. J. Ham LD/O 3 - R. M. Kelso O 1 - W. D. Reeves O 2 - G. A. Pennington O 3 - J. P. Shannon MOD - A. L. Briscoe | KSC PAD 39A 182:18:01:59:96Z 1:50:00 PM EDT (P) 2:02:00 PM EDT (A) TUESday 12 7/1/97 (5) LAUNCH WINDOW: 2H30M CTOB EOM PLS: KSC TAL: BYD TAL WX: BEN SELECTED: RTLS: KSC 15/N/N TAL: BYD 32 AOA: EDW 22/N/N PLS: EDW 22/N/N PLS: EDW 22/N/N TDEL: 0.01 0.382/0.42 MAX Q NAV: 701 PSF 703 PSF SRB STG: 2:03.5 2:04 PERF: NOMINAL 2 ENG TAL (BYD): 2:41 2:41 NEG RETURN: 3:56 3:58 PTA (U/S): 5:11 5:08 DROOP (BYD): 5:27 5:30 PTM (U/S): 7:03 7:05 MECO CMD: 8:28.6 8:29 VI: 25877 25871 OMS-2: 39:53 222 FPS 221.7 FPS BURN TIME: 2:23 2:23 | KSC 33 (KSC 38) 198:10:46:33 Z 6:46:33 Z 6:46:33 AM EDT Thursday 9 7/17/97 (8) DEORBIT BURN: 198:09:43:45Z XRANGE: 81.7 NM ORBIT DIR: DL 42 AIM PT: NOMINAL MLGTD: 3056 FT 198:10:46:33Z VEL: 208 KGS 202 KEAS HDOT: -1.1 FPS TD NORM 205: 2774 FT DRAG CHUTE DEPLOY: 194 KEAS 198:10:46:37Z NLGTD: 6583 FT 198:10:46:47Z VEL: 158 KGS HDOT: -5.9 FPS BRK INIT: 100 KGS DRAG CHUTE JETTISON: 52 KGS 152 KEAS HDOT: -5.9 FPS BRK INIT: 100 KGS DRAG CHUTE JETTISON: 52 KGS 198:10:47:12Z BRK DECEL FPS ² : AVE 5.8 PK 7.2 WHEELS STOP: 198:10:47:31Z 11948 FT ROLLOUT: 8892 FT 8892 FT 58 SEC WINDS: T1, 0X KTS OFFICIAL: 1502P02 T2, 0X KTS DENS ALT: 1113 FT FLT DURATION: 15:16:44:33 S/T: 708:07:31:41 OV-102: 237:07:55:39 DISTANCE: 6,200,000 sm | 104/104/ 109% PREDICTED: 100/104/104/ 67/104 ACTUAL: 100/104/104/ 69/104 1 = 2037 (4) 2 = 2034 (9) 3 = 2033 (9) M.3 EOM: WEIGHT: 230818 LBS X CG: 1078.40 LANDING: WEIGHT: 230773 LBS X CG: 1080.10 | ort): PL w (It to r | T Still 8 t): Ger | DEORBIT: 163.4 X 160.1 NM DEORBIT: 162 X 156.4 NM VELOCITY: 25793 FPS ENTRY RANGE: 4396 NM | rait. | CARGO: 34359 LBS PAYLOAD CHARGEABLE: 25568 LBS DEPLOYED: 0 LBS NON-DEPLOYED: 23536 LBS MIDDECK: 2032 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 1230575 LBS CARGO TOTAL: 2552583 LBS PERFORMANCE MARGINS (LBS): FPR: 3200 FUEL BIAS: 809 FINAL TDDP: 2845 RECON: 4193 PAYLOADS: PLB: Microgravity Science Laboratory. Protein Crystallography, Combustion Science, and Materials Sciences (MSL-1/LM) OARE CRYOFD MIDDECK: SAREX-II MSX 5 CRYO TK SETS + 4 EDO 5 N2 TANKS EDO PALLET NO RMS | LAUNCH POSTPONEMENTS: None Reflight of MSL-01/STS-83 was baselined as STS-83R on 4/10/97 with a launch date of 7/1/97. On 4/25/97, STS-83R was renumbered STS-94. LAUNCH SCRUBS: None - LAUNCH DELAYS/EARLY LAUNCH TIMES: At the L-1 MMT, the weather forecast at KSC for 7/1/97 launch at 1837Z was thunderstorms/rain with 90% probability of NO-GO. The decision was made to move the launch time 47 minutes early to improve the probability of launch, which changed the EDW landing opportunities from 2-2-2 to 1-1-1. New launch time was 1750Z. Counted down to T-9 minutes and held due to thunderstorm forecast for RTLS landing time. Thunderstorms at RTLS time was removed from the forecast. Launch delay was 12M00S TAL WX: Banjul was prime and selected. Banjul was NO GO for most of the count for 3000 feet broken but became GO late in count. Ben Guerir forecast and observed GO. DOLILU-II I-LOADS: DOLILU-II uplink #16, I-load uplink #35. KSC LANDING WEATHER: - Forecast for landing time was technically NO-GO for rain within 30 NM; however, rain was offshore, moving NE, and approach path was clear. Observed GO at deorbit burn minus 2 minutes. At landing time, rain was 29 ESE. Flight rule waiver written. FLIGHT DURATION CHANGES: None. FIRSTS/LASTS: - First reflight of Same payloads (MSL-01 with same crew after STS-83 minimum duration flight declared due to FC2, substack 3 delta volts change) First flight of Wraparound DAP (called part 5) used for complete entry. RCS usage 500 lbs vs baseline 700 lbs and redline 1430 lbs (28.45 inclination). EVENTS: - Entry was observed at approx 16 degrees elevation in Houston Deorbit burn was 298.5 FPS. SIGNIFICANT ANOMALIES: - First reflight of Wraparound DAP (called part 5) used for complete entry. RCS usage 500 lbs vs baseline 700 lbs and redline 1430 lbs (28.45 inclination). EVENTS: - Entry was observed at approx 16 degrees elevation in Houston Deorbit burn was 298.5 FPS. SIGNIFICANT ANOMALIES: - FIRST Glight of Wraparound DAP (called part 5) used for complete entry. RCS usag |
| | | -1 100 | | .,, | Halsell, & Thomas/I | | | | | | - William #7 dealts impact reported by crew APU 3 fuel isolation valves on heated string B cycling low Tempus top video camera failure. |
| | | | | | | | | | | | - rempus top video camera fallule. |

| | | | OI. | LANDING SITE/ SSME-TI | | | | | | | Page 2-104 - 515-65 |
|--|------------------------------------|---|--|--|--|---|------------|---|---------|---|--|
| FLT NO. | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES | SSME-TL NOM-ABORT EMERG THROTTLE | SRB RSRM AND | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, |
| | | TITLE, NAMES & EVA'S | ABORT TIMES | FLT DURATION, WINDS | PROFILE ENG. S.N. | ET | | · | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-85 SEQ FLT #86 KSC - 86 | OV-103 (Flight 23) Discovery | CDR: Curtis L. Brown, Jr. (Fit 4 - STS-47, STS-66 & STS-77) P497/R152/V112/M136 PLT: | KSC PAD 39A 219:14:40:59.98Z 10:41:00 AM EDT (P) 10:41:00 AM EDT (A) Thursday 25 8/7/97 (6) | KSC 33 (KSC 39) | 104/104/ 109% PREDICTED: 100/104/104/ 67/104 | BI-089 RSRM 57 ET-87 | 57 (19) | DIRECT INSERTION POST OMS-2: 161 X 160 NM | (1) | CARGO: 31959 LBS PAYLOAD CHARGEABLE: 24982 LBS | KSC W/D: OPF 102 , VAB 5, PAD 23 = 130 days total. LAUNCH POSTPONEMENTS: - Baselined launch date of 7/17/97 on 3/28/96 Postponed launch date to 8/7/97 on 4/17/97 caused by |
| PAD 39A-50 MLP-3 | OMS PODS: | Kent V. Rominger (Flt 3 - STS-73, STS-80) P498/R200/V131/M174 M/S 1 (PAYLOAD CDR): | LAUNCH WINDOW: 1H39M CHRISTA- SPAS BETA | DEORBIT BURN: 231:10:07:30Z XRANGE: 346 NM | ACTUAL: 100/104/104/ 67/104 | LWT-80 | | <u>SEP-1</u> : 219:22:28:00 160.0 X 158.9 NM | | <u>DEPLOYED</u> : 0 LBS | remanifest to refly MSL-1 due to STS-83 early termination. LAUNCH SCRUBS: None LAUNCH DELAYS: None |
| - CUT | RPO3-23 FRC3-23 | N. Jan Davis (Fit 3 - STS-47, STS-60) P499/R153/V100/F17 M/S 2: Robert L. Curbeam, Jr. P500/R224/M195 | REQUIREMENTS EOM PLS: KSC TAL: ZZA TAL WX: MRN, BEN | ORBIT DIR: AR 7 AIM PT: NOMINAL MLGTD: 2917 FT | 1 = 2041 (3) 2 = 2039 (3) 3 = 2042 (2) | ET PRED RPT: 271.3K ET | | TI: 228:12:50:47 157.7 X 154.3 NM | | NON-DEPLOYED: 24982 LBS MIDDECK: 1590 LBS | TAL WX: - ZZA was prime but forecast NO GO with thunderstorms within 20 nm. MRN (selected) and BEN were forecast and observed GO. |
| W. W | COLUMN . ROBINS | M/S 3: Stephen K. Robinson P501/R225M196 P/S 1: Bjarni V. Tryggvason (Canada) | SELECTED: RTLS: KSC 33/N/N TAL: MRN 20/N/N AOA: NOR 35/N/SF PLS: EDW 22/N/N | 192 KEAS | M 3 EOM: WEIGHT: 221335 LBS X CG: 1081.95 | <u>BRKUP</u> : 214K | | DEORBIT: 4492 NM VELOCITY: 25755 FPS | | SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 837857 LBS NON-DEPLOYED: | DOLILU-II I-LOADS: DOLILU-II uplink #17, I-load uplink #36. PERFORMANCE ENHANCEMENTS (FIRST FLIGHT): |
| | 8 5 | P502/R226/M197 MCC WHITE FCR (16) | TDEL: 0.0 -0.198/-0.16 MAX Q NAV: 699 PSF 703 PSF | 2550 FT DRAG CHUTE DEPLOY: 185 KEAS 231,11,00,017 | <u>LANDING</u> : WEIGHT: 221264 LBS | ET IMPACT 1:14:30 MET LAT: 42.77°S | | ENTRY RANGE: 4492 NM ENTRY | | 1247831 LBS CARGO TOTAL: 2584542 LBS PERFORMANCE | - Flight control filter updates Yaw gain enhancement Constant pitch rate at SRB separation. FLIGHT DURATION CHANGES: |
| | | FLIGHT DIRECTORS: A/E/O1 - N. W. Hale LD/O 2 - B. P. Austin PLNG - G. A. Pennington MOD - A. L. Briscoe & J. W. Bantle | SRB STG: | NLGTD: 6065 FT 231:11:08:09Z VEL: 153 KGS 144 KEAS HDOT: -6.1 FPS | X CG: 1083.63 | 42.77°S LONG 154.86° W | | ATTITUDE: 139.2 X 138.4 NM | | MARGINS (LBS): FPR: 3200 FUEL BIAS: 809 FINAL TDDP: 1446 RECON: 3065 | FLIGHT DURATION CHANGES: - Planned landing time was 230:11:14 on 8/16/97, orbit 174. Waved off this only landing opportunity to land at KSC due to forecast of probability of fog. SLF was observed GO at landing time. Landed on orbit 190 Flight duration extended 1 day. |
| STS085 | -706-051 | Release of CRISTA- | 2 ENG TAL (MRN): 2:53 2:50 NEG RETURN: 4:01 4:02 | BRK INIT: 84 KGS DRAG CHUTE JETTISON: 55 KGS 231:11:08:37Z | | | ~ ~ · | | er k el | PAYLOADS: PLB: CRISTA-SPAS-02 (Atmospheric physics, dynamics, | FIRSTS/LASTS: - First flight of OI-26 First flight at 57 degrees inclination since STS-66 First flight of complete Wraparound DAP (DTO 255). Used approx 330 lbm RCS from EI to M=1 (vs. redline of 1630 lbm). |
| SPAS-2 | | | PTA (U/S 298): 5:11 5:12 DROOP (ZZA): 5:28 5:34 | BRK DECEL FPS2: AVE 5.7 PK 7.2 WHEELS STOP: 231:11:09:07Z 11709 FT | | 4 | N. | 0-0 | | physics, dynamics, and chemistry by MAHRSI, SESAM, MIDES, GAPS, and IPEX) MFD (Robot Arm) TAS-01 (8 | FOURTH SHUTTLE CREWMEMBER REPLACEMENT - Jeff Ashby was replaced by Rominger in March 1997. (Third shuttle crewmember replacement occurred on STS-46.). EVENTS: |
| | | | PTM (U/S 579): 7:05 7:10 MECO CMD: 8:30.7 8:32.7 | ROLLOUT: 8792 FT WINDS: T5, L3 KTS OFFICIAL: | A | | | | 5 | technology and science experiments) IEH-2 (UV exp) | - Launched on Kent Rominger's birthday CHRISTA-SPAS deployed at 00:07:46:04 MET, 219:22:27:04Z CHRISTA-SPAS captured at 228:15:13Z, 09:00:32 MET Berthed and latched at 228:16:30:12Z, 09:01:49:32 MET. |
| | | | VI: 25831 25823 | 2006P09, T4, L5 KTS <u>DENS ALT</u> : 1565 FT <u>FLT DURATION</u> : | KTS FT | | | | | SWUIS, BDS-03, BRIC-10, PCG- STES, SSCE, ACIS, MSX, SIMPLEX | RENDEZVOUS #38: Deployed, rendezvoused, grappled, and berthed CHRISTA-SPAS. SIGNIFICANT ANOMALIES: |
| | | | OMS-2: 33:06 33:06 254 FPS 254 FPS | 11:20:26:58 <u>S/T</u> : 720:03:58:39 <u>OV-103</u> : 167:19:53:59 | STS085-326-016 Impromptu in-flight crew portrait: (Left to right) PLT Rominger, Curbeam/MS, Robinson/MS, | | | | | 5 CRYO TK SETS 5 N2 TANKS RMS 48 (S.N. 301) RMS Used For | CRT 1 transient BITE message. Supply H₂O tank A quantity erratic. APU 1 seal cavity drain line pressure decay. APU 1 fuel pump thermostat cyclic in narrow band. Payload commanding problems with MCC input set to 3/sec. |
| | | | | <u>DISTANCE</u> : 4,725,000 sm | CDR Brown, Davis/MS/PLC, & | | | | | CHRISTA-SPAS deploy, grapple, and berth | |

| | | | | | | | | 140 001 | | | |
|---|--|---|--|--|---|--|------------------------|---|--------------|--|--|
| FLT | ORBITER | CREW (8) 7UP. 7DOWN | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-86 SEQ FLT #87 KSC - 87 PAD 39A-51 MLP- 2 | OV-104 (Flight 20) Atlantis Spacehab 8 OMS PODS: LP03-24 RP04-20 FRC4-20 | CDR: James D. Wetherbee (Fit 4 - STS-32, STS-52, STS-63) P503/R108/V80/M97 PLT: Michael J.Bloomfield P504/R227/M198 M/S 1 EV2: Vladimir Titov (Russia) (Fit 2 - STS-63) P505/R189/V144/M165 | RSC PAD 39A 269:02:34:18.96 Z 10:34:19 PM EDT (P) 10:34:19 PM EDT (A) Thursday 26 9/25/97 (9) LAUNCH WINDOW: 6M38S USING PLT MIR PLANAR /PHASING WINDOW EOM PLS: KSC TAL: ZZA TAL WX: MRN, BEN SELECTED: RTLS: KSC 33/N/SF TAL: MRN 20 AOA: KSC 15/CI/N PLS: EDW 04/CI/N TDEL: 0.05 0.162/0.20 MAX O NAV: 723 721 SRB STG: 2:03.05 2:03 PERF: NOMINAL 2 ENG TAL (MRN): 2:32 2:33 NEG RETURN: 4:02 4:04 PTA (U/S 269): 4:48 4:49 DROOP (MRN): 5:22 5:24 PTM (U/S 760): 6:53 6:55 MECO CMD: 8:30.5 8:31 VI: 25876 25872 OMS-2: 41:50 41:50 171.8 FPS171.8 FPS | RSC 15 (KSC 40) 279:21:55:10Z 5:55:10 PM EDT Monday 16 10/6/97 (7) DEORBIT BURN: 279:20:47:45Z XRANGE: 376 NM ORBIT DIR: AL 19 AIM PT: NOMINAL MLGTD: 2420 FT 279:21:55:10Z VEL: 198 KGS 194 KEAS HDOT: -2.2 FPS TD NORM 195: 2592 FT DRAG CHUTE DEPLOY: 152 KEAS 279:21:55:22Z NLGTD: 5522 FT 279:21:55:19 VEL: 163 KGS 159 KEAS HDOT: -6.1 FPS BRK INIT: 60 KGS DRAG CHUTE JETTISON: 67 KGS 279:21:55:57Z BRK DECEL FPS ² : AVE 3.7 PK 5.0 WHEELS STOP: 279:21:56:31Z 14367 FT ROLLOUT: 11947 FT 81 SEC WINDS: H2, L9 KTS OFFICIAL: 0707P14 H2, L9 KTS Continued | Toly/104/ 109% PREDICTED: 100/104/104/ 67/104 67/104 67/104 67/104 1 = 2012 (20) 2 = 2040 (3) 3 = 2019 (18) M 3 EOM: WEIGHT: 215387 LBS X CG: 1081.33 LANDING: WEIGHT: 215303 LBS X CG: 1083.03 STS086-7 View of d panel & ra Spektr ca Progress ship that Mir June Causing S repressur photo dur | amaged sadiator or used by re-supply collided version 25,1997, Spektr to rize. (Atla | solar n Mir vith | DIRECT INSERTION POST OMS-2: 161 X 138.5 NM NC1: 269:05:59:10Z 201 X 150.9 NM TI: 270:17:31:56Z 211.2 X 203.5 NM MCC4: 270:18:52:13Z 211.8 X 204.3 NM UNDOCK: 276:17:28:34Z 212 X 204.4 NM SEP: 276 DEORBIT: 207 X 190 NM VELOCITY: 25898 FPS ENTRY RANGE: 4380 NM ENTRY ATTITUDE: 205.9 X 190.8 NM | OI-26 (2) | CARGO: 29728 LBS PAYLOAD CHARGEABLE: 21039 LBS DEPLOYED: 6058 LBS NON-DEPLOYED: 14379 LBS MIDDECK: 602 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 843915 LBS CARGO TOTAL: 2614270 LBS PERFORMANCE MARGINS (LBS): FPR: 3200 FUEL BIAS: 809 FINAL TDDP: 1446 RECON: 3065 PAYLOADS: PLB: SHUTTLE/MIR MISSION 7 SPACEHAB DOUBLE MODULE ODS, SEEDS - II MIDDECK: CREAM SIMPLEX KIDSAT CPCG CCM-A 5 CRYO TK SETS 4 N2 TANKS NO RMS | KSC W/D: OPF 60, VAB 5, PAD 29 = 94 days total. LAUNCH POSTPONEMENTS: - Baselined launch date of 9/11/97 on 6/21/96; orbiter OV-104 Postponed launch date to 9/18/97 on 8/1/96; multi-flight changes Changed from orbiter OV-104 to OV-105 on 3/27/97 Postponed launch date to 9/25/97 on 4/17/97; multi-flight changes for re-flight of MSL-01 (on STS-94) Advanced launch date to 9/18/97 on 4/25/97 and moved back to orbiter OV-104 (from OV-105) Postponed launch date to 9/18/97 (GMT), 9/25/97 EDT, on 8/21/97. LAUNCH SCRUBS: None LAUNCH WINDOWS: - The total launch window for the two panes was 10:57. However, using the preferred liftoff time of 269:02:34:19 (4m19s into window) the window was only 6m38s. LAUNCH DELAYS: None TAL WX: - ZZA was prime but was forecast NO GO (ceiling) at L-15 minutes, MRN was forecast GO and was selected. Both ZZA and MRN were observed GO at TAL time. BEN was forecast NO GO (ceiling) until L-8 minutes and was observed GO at TAL time. SHUTTLE NIGHT LAUNCH: #18 DOLILU II I-LOADS: - DOLILU II uplink #18, total uplink #37. PERFORMANCE ENHANCEMENTS: - Flight control filter updates Yaw gain enhancement Constant pitch rate at SRB separation Auto delta psi. FLIGHT DURATION CHANGES: - Waved off landing on orbit 155 due to observed broken 4000 feet, but forecast GO Waved off landing on orbit 156 (observed GO), but forecast NO GO 5000 feet broken Landed on orbit 170 Flight duration extended 1 day. FIRSTS/LASTS: - First flight using a Preferred Liftoff Time (PLT), which was not at window opening First shuttle EVA with an International Partner (V. Titov, Russia). |
| | | | L | Continuou | 1.1.1.1.24111 | add HTE | | | | | Continued |

| FLT NO. | ORBITER | CREW (8) 7UP, 7DOWN | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG THROTTLE | SRB RSRM | INIC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|------------|---------|------------------------------------|-------------------------------|---|---|-------------|------|----------------|--|----------------------------------|--|
| | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | PROFILE ENG. S.N. | AND ET | IIVC | па/пр | | EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-86 | | Continued | | Continued | | | | Ш | La Contraction of the Contractio | | Continued |
| Continued | | SS EVA #39 EMU/Tethered EVA #32 | | DENS ALT: 1506 FT | | | | | | | <u>EVENTS</u> : - Mir capture at 270:19:57:46Z, 01:17:23:27 MET |

Scheduled EVA #34 FLT DURATION: 10/1/97 10:19:20:51 5H01M26S Duration <u>S/T</u>: 730:28:19:30 MCC WHITE FCR (17) FLIGHT DIRECTORS: <u>OV-104</u>: 150:22:30:25 A/E - L. J. Ham LD/O 1 - P. D. Dye O 2 - C. W. Shaw DISTANCE: PLNG - P. L. Engelauf MOD - R. E. Castle 4,225,000 sm



STS086-371-004 -- Seven STS-86 crew members are joined by the three-member Mir-24 crew in the Spacehab Module for in-flight portrait. New Mir-24 crew member Wolf holds a cap (right). Clockwise from him are: Titov/MS/RSA, Mir CDR Anatoliy Y. Solovyev, Parazynski/MS, Pavel V. Vinogradov/Mir/FE, CDR Wetherbee, Lawerence/MS, Foale/MS, PLT Bloomfield, & Chretien/MS.

- Docking complete at 270:20:06:15Z, 01:17:31:56 MET Foale transfer to STS-86 and David Wolf transfer to Mir 24
- at 2D14H00M, 271:16:34:19Z. Foale Mir stay time
- at 2D14H00M, 271:16:34:19Z. Foale Mir stay time
 134:02:13:31, total flight time 144:13:47:22.
 Foale completed a Mir EVA with Anatoly Solovyev with exit
 from KVANT-2 airlock in Orlan M suits (5.7 psia). Both were
 double tethered using U.S. tether reel and waist tethers.
 EVA duration was 5H59M to inspect Specktr module leak,
 slew solar arrays, and put out dosimeter.
 Scott Parazynski and Vladimir Titov made a Shuttle EVA to
 retrieve MEEP experiments left on Mir DM on STS-76.
 Jean-Loup Chretien flew on Soyuz T-6/Salyut 7 and Soyuz
 TM.7/Mir11
- TM-7/Mir11.
- Hooks open 276:17:25:59Z, 07:14:51:40 MET Undock 276:17:28:15Z, 07:14:53:56 MET (one rev late to check Mir computer interface box).
- Total consumables transferred to Mir: 1717.2 lbm H₂O (17 CWC's), 75.7 lbm O₂, 130.7 lbm N₂.
- Wendy was to replace Foale; however, concerns of inadequate reach in Orlan EVA spacesuit, Wolf moved to STS-86 from STS-89.

RENDEZVOUS #39:

Rendezvous and dock with Mir Space Station.

SIGNIFICANT ANOMALIES:

- Fuel Cell 2 substack 1 differential volts transient.
- Primary RCS thruster L3D failed off.
- EVA Safety Tether Reel failure.

 WSB 3 vent heater failure on B controller.



STS086-332-021--Parazynski tethered to cargo bay handrail during EVA shared Titov (RSA) out of photo.



sts086-720-056 -- Mir as seen by departing Atlantis.

| | | | 3 P | ACE SHU | JIILE | IVIIO | 310 | 143 30 | IVIIVI | AKI | Page 2-107 - 515-67 |
|--|---|--|---|---|---|---|------------------------|--|--------------|---|--|
| FLT NO. | ORBITER | CREW (6) TITLE, NAMES | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, | SSME-TL NOM-ABORT EMERG THROTTLE PROFILE | SRB RSRM AND ET | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| FLIGHT D ASC - N. V ENT - J. P LD/O 4 - V O 2 - J. W | TE FCR (18) IRECTORS: V. Hale . Shannon V. D. Reeves . Bantle Hill (1 Shift) Austin Algate | & EVA'S CDR: Kevin R. Kregel (Fit 3 - STS-70, STS-78) P511/R197/V129/M172 PLT: Sleven W. Lindsey P512/R229/M200 M/S 1: Kalpana Chawla P513/R230/F30 M/S 2: Winston E. Scott (Fit 2 - STS-72) P514/R207/V148/M180 M/S 3: Takao Doi (Japan) P515/R231/M201 P/S 1: Leonid Kadenyuk (Ukraine) P516/R232/M202 SS EVA #40 EMU/Tethered EVA #33 Scheduled EVA #35 on 11/24/97 7H42M55S Duration EVA start at 05:04:16:05 MET SS EVA #41 EMU/Tethered EVA #44 EMU/Tethered EVA #34 Unscheduled EVA #6 | KSC PAD 39B 323:19:45:95.6Z 2:46:00 PM EST (P) 2:46:00 PM EST (A) Wednesday 9 11/19/97 (12) LAUNCH WINDOW: 2H30M CTOB EOM PLS: KSC TAL: BYD TAL WX: BEN, MRN SELECTED: RTLS: KSC 33/CI/N TAL: BYD 32/N/N AOA: EDW 22/N/N | WINDS KSC 33 (KSC 41) 339:12:20:04Z 7:20:04 AM EST Friday 10 12/5/97 (9) DEORBIT BURN: 339:11:21:28Z XRANGE: 66 NM ORBIT DIR: DL 43 AIM PT: CLOSE IN MLGTD: 2549 FT 339:12:20:04Z VEL: 189 KGS 196 KEAS HDOT: -1.1 FPS TD NORM 205: 1821 FT DRAG CHUTE DEPLOY: 188 KEAS 339:12:20:08Z NLGTD: 5612 FT 339:12:20:14Z VEL: 147 KGS 151 KEAS HDOT: -4.6 FPS BRK INIT: 107 KGS DRAG CHUTE JETTISON: 61 KGS 339:12:20:38Z | ENG. S.N. 104/104/ 109% PREDICTED: 100/104/104/ 67/104 ACTUAL: 100/104/104/ 67/104 1 = 2031 (16) 2 = 2039 (4) 3 = 2037 (5) M 3 EOM: WEIGHT: 232930 LBS X CG: 1080.99 LANDING: WEIGHT: 232849 LBS X CG: 1082.58 | BI-092 RSRM 63 ET-89 LWT-82 ET PRED RPT: 271.3K ET BRKUP: 269.1K ET IMPACT 1:25:02 MET LAT: 20.28°N LONG: 147.99° W | (46) | DIRECT INSERTION POST OMS-2: 155 X 150 NM SEP BURN: 02:03:25:30 MET NC5 MANEUVER: 05:01:33:33 MET TI: 05:03:04:38 MET DEORBIT: 149.7 X 145.5 NM VELOCITY: 25760 FPS ENTRY RANGE: 4424 NM | Ol-26 (3) | CARGO: 34395 LBS PAYLOAD CHARGEABLE: 21946 LBS DEPLOYED: 0 LBS NON-DEPLOYED: 17496 LBS MIDDECK: 1452 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 1281760 LBS NON-DEPLOYED: 1281760 LBS CARGO TOTAL: 2648665 LBS PERFORMANCE MARGINS (LBS): FPR: 3085 FUEL BIAS: 853 FINAL TDDP: 4384 RECON: 6115 PAYLOADS: PLB: SPARTAN-201 | KSC W/D: OPF 94, VAB 5, PAD 22 = 121 days total. LAUNCH POSTPONEMENTS: - Baselined 10/9/97 launch date on 7/11/97 Postponed launch date to 11/13/97 on 4/17/97 Postponed launch date to 11/13/97 on 5/22/97. LAUNCH SCRUBS: None. LAUNCH DELAYS: None. TAL WX: - Banjul (prime and selected), Ben Guerir, and Moron were all forecast and observed GO. DOLILU/I-LOADS: - DOLILU/I-LOADS: - DOLILU/I-LOADS: - Flight control filter updates Yaw gain enhancement Constant pitch rate at SRB separation First stage trim, second stage trim, and roll to headsup. FLIGHT DURATION CHANGES: - None. Landed on orbit 252. FIRSTS/LASTS: - First flight with the following performance enhancements: - Roll-to-heads-up at approximately 6:10 MET, APM loss of 70 lbs Ascent DAP trim (APM gain of approximately 270 lbs) Extended pitch parallel to MECO (APM gain of approximately 125 lbs) Spartan deploy was delayed 1 day to allow recovery of SOHO |
| free-flyi | | on 12/3/97 4H59M40S Duration EVA start at 13:13:24 MET out (left) & Doi grab 01 satellite and berth | DROOP (BYD): -5:25 5:30 PTM (U/S 567): 6:58 7:00 MECO CMD: 8:28.5 8:29.9 VI: 25872 25873 OMS-2: 41:04 41:08.9 192.9 FPS 193.8 FPS | BRK DECEL FPS2: AVG 4.7 PK 7.7 WHEELS STOP: 339:12:21:02Z 10553 FT ROLLOUT: 8004 FT 58 SEC WINDS: 6H, 0X KTS 0FFICIAL: 3306P10 6H, 0X KTS DENS ALT: -195 FT FLT DURATION: 15:16:34:04 S/T: 746:15:53:34 0V-102: 253:00:29:43 DISTANCE: 6,544,000 sm | to rt), PL7 | Γ Lindse , In bac | y, Doi/ľ k (lt to l | ddeck: In fro MS (NASDA tt), CDR Kre 2S. STS087 020 Spartan satellite grasp of RMS | ont (It) & | TGDF AERCAM SPRINT MIDDECK: USMP-04/MGBX CUE, MSX, SIMPLEX 5 CRYO TK SETS + 4 EDO 5 N2 TANKS RMS 49 (S.N. 301) | Sparlan deploy at 325:21:04:00Z, 02:01:18 MET. Sparlan failed to perform pirouette maneuver indicating a problem. Attempt to grapple Sparlan at 02:01:24 MET failed, and a tip-off rate of 2 deg/sec was introduced. Separation burn was made at, 02:03:25:30 MET. Decision to hand capture Sparlan by two EVA crew, done at 05:05:18:00 MET (rates were very low). RMS berth assist was required with Sparlan grapple at 05:06:53 and berth at 05:07:37:22 MET. EDFT-05 tasks were performed on EVA 1 and evaluated crane. An unscheduled EVA 2 was performed to deploy, maneuver, and retrieve a free flying video camera (AERCam Sprint) and to perform EDFT-05 tasks which were planned for EVA 1. RADIATOR DEPLOY #20 Starboard and port radiators deployed twice for thermal control and water production. RENDEZVOUS #40: Deploy Spartan, separate, rendezvous and retrieve Sparlan. SIGNIFICANT ANOMALIES: Slicky supply water A/B check valve. H2 tank 4 quantity measurement failure. EV 2 helmet light intermittent. Left outboard fire pressure measurement lost. Spartan MPESS EVA ingress aid extend/stow difficulty during retrieval. RCS jet R5D heater fail off. |

| | | | 3F/ | ACE SHU | | E MISSIONS S | | | IALIAI | AIX I | · · |
|--|--|--|--|--|---|---|--|--|-----------------|---|---|
| FLT NO. | ORBITER | CREW 7 UP, 7 DOWN TITLE, NAMES & EVA'S | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS | SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N. | SRB RSRM AND ET | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-89 SEQ FLT #89 KSC - 89 PAD 39A-52 MLP-3 | OV-105 (Flight 12) Endeavour Spacehab 9 OMS PODS: LPO4-19 RPO1-26 FRC5-12 | & EVA'S CDR: Terrence W. Wilcutt (Fit 3 - STS-68, STS-79) P517/R183/V130/M160 PLT: Joseph F. Edwards Jr. P518/R233/M203 M/S 1: James F. Reilly, II P519/R234/M204 M/S 2: Michael Anderson P520/R235/M205 M/S 3: (PAYLOAD CDR): Bonnie J. Dunbar (Fit 5 - STS-61-A, STS-32, STS-50-STS-71) | KSC PAD 39A 23:02:48:14.98Z 9:48:15 PM EST (P) 9:48:15 PM EST (A) Thursday 27 1/22/98 EST (9) LAUNCH WINDOW: 7M 56S Using PLT MIR PLANAR/ PHASE WINDOW EOM PLS: KSC TAL: ZZA TAL WX: MRN, BEN SELECTED: RTLS: KSC 15/CI/N TAL: ZZA 30/CI/N AOA: NOR 17/IN/SF PLS: EDW 22/N/SF TDEL: 0.14 -0.098/0.1 MAX Q NAV: 702 PSF 710 PSF SRB STG: 2:03.8 2:06 | KSC 15 (KSC 42) 31:22:35:09Z 5:35:09 PM EST Saturday 19 1/31/98 (8) DEORBIT BURN: 31:21:27:55Z XRANGE: 600NM ORBIT DIR: AL 20 AIM PT: NOMINAL MLGTD: 2702 FT 31:22:35:09Z VEL: 202 KGS 198 KEAS HDOT: -2.3 FPS TD NORM 195: 2776 FT DRAG CHUTE DEPLOY: 190 KEAS 31:22:35:13Z NLGTD: 6112 FT 31:22:35:20Z VEL: 152 KGS 149 KEAS | PROFILE ENG. S.N. 104/104/ 109% PREDICTED: 100/104/104 67/104 ACTUAL: 100/104/104 67/104 1 = 2043 (1) 2 = 2044 (1) 3 = 2045 (1) M 3 EOM: WEIGHT: 217475 LBS X CG: 1086.45 LANDING: WEIGHT: 217422 LBS X CG: 1088.16 | BI-093 RSRM 64 ET-90 LWT-83 ET RPT: 271.3K ET BRKUP: 269.1K ET IMPACT 1:27:09 MET I.27:09 | 51.65 (9) | DIRECT INSERTION POST OMS-2: 162.4 X 161.1 NM TI: T:15:03:04 MET 215.6 X 203.4 NM SEP1: 6:15:28:26 MET 206.6 X 203.2 NM DEORBIT: 207.1 X 193.7 NM VELOCITY: 25900 FPS ENTRY RANGE: 4341 NM | Ol-26 (4) | CARGO: 28040 LBS PAYLOAD CHARGEABLE: 22163 LBS DEPLOYED: 4596 LBS NON-DEPLOYED: 16699 LBS MIDDECK: 868 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 1299327 LBS CARGO TOTAL: 2676765 LBS PERFORMANCE MARGINS (LBS): FPR: 3272 FUEL BIAS: 854 FINAL TDDP: 2309 | KSC W/D: OPF 202, VAB 7, PAD 26 = 235 days total. LAUNCH POSTPONEMENTS: - Baselined 1/15/98 launch date on 10/1/96 Moved STS-89 from OV-103 to OV-105 on 5/22/97 Postponed launch date to 1/22/98 EST (1/23/98 GMT) on 12/18/97. LAUNCH SCRUBS: None LAUNCH DELAYS: None TAL WX: - Zaragoza (prime and selected) and Moron forecast and observed GO. Ben Guerir was forecast NO GO for ceiling and visibility (very dense fog). SHUTTLE NIGHT LAUNCH: #19 DOLILU/I-LOADS: - DOLILU /I uplink #20, total uplink #39. PERFORMANCE ENHANCEMENTS: - Standard set plus Block IIA SSME's. FLIGHT DURATION CHANGES: - None. Landed on orbit 139. FIRSTS/LASTS: - First flight using Block IIA SSME's. (Rocketdyne HPFTP) - First flight with external airlock. |
| FLIGHT DI ASCENT- LD/O1- P.L O2- R.E. C PLNG- P.S ENTRY- J. MOD - A. L | Engelhauf astle i.Hill P. Shannon | return on 21S-91. P523/R213/V149/M186 M/S 6 Descent David A. Wolf (Fit 2- STS-58) Ascent on STS-86, stay on Mir 24. P524/R173/V147/M151 | <u>VI:</u> 25876 25873 <u>OMS-2:</u> 41:46 41:48 213 FPS 213 FPS | HDOT: -5.9 FPS BRK INIT: 94 KGS DRAG CHUTE JETTISON: 56 KGS 31:22:35:53Z BRK DECEL FPS ² : AVE 3.6 PK 5.0 WHEELS STOP: 31:22:36:21Z 12492 FT ROLLOUT: 9790 FT 72 SEC WINDS: 4T, 4L KTS OFFICIAL: 0205P11 7T,8L DENS ALT: -103 FT FLT DURATION: 8:19:46:54 S/T: 755:11:40:28 OV-105: 121:08:50:00 DISTANCE: 3,610,000 sm | convention Wolf/MS(for Vinogrador CDR Anator Dunbar/MS bottom row | al position ormer Mir y/ Mir-24/ bly Y. Sol S/PLC. A y (from le & PLT Ed as/MS/Mi | on (from guest), FE, CE ovyev, bove, h ft) Shari lwards. | Pavel V. DR Wilcutt, M R nead-to-head pov/MS (RSA At 90 deg an | /lir-24 with | RECON: 3594 PAYLOADS: PLB: SHUTTLE/MIR MISSION 8 SPACEHAB (Double Module) GAS (4) ODS MIDDECK: HP, MPNE, AST, CREAM, SIMPLEX, SAMS, MGM (2), CEBAS, EARTHCAM 5 CRYO TK SETS 6 GN2 TANKS NO RMS | - First light with extertina allock. Record number of people in orbit: Mir 3 - 2 Russians, 1 American; Soyuz 3 - 2 Russians, 1 French; Endeavour 7 - 6 Americans, 1 Russian. EVENTS: - Mir capture at 24:20:14:21Z, 1:17:26:06 MET Docking complete at 24:20:23Z, 1:17:35 MET Andrew Thomas transferred to Mir 24 and David Wolf to STS-89 Endeavour at 26:05:51:15Z, 3D13H3M. David Wolf total Mir time 119:23:16:56 and total flight time 127:20:00:50 Undocking at 29:16:56:56Z, 6:14:08:41 MET Inert weight adjustment of -200 lbs included in STS OPR chargeable. RENDEZVOUS #41: - Rendezvous and dock with Mir. RADIATOR DEPLOY #21: SIGNIFICANT ANOMALIES: - GPC 3 mode switch no apparent detent at standby. Went to halt from run Payload bay floodlights FWB STBD and MID PORT failed (new design) IIPS and OCA problems Z Star Tracker pressure fail BITE S-Band antenna electronics 2 failed to select the best antenna Vestibule vent valves were misconfigured (3 of 4 open) Vernier thruster L5D oxidizer temp failed erratic, attitude control passed to Mir jets, then to orbiter PRCS Right RCS fuel helium isolation valve B failed to open Vernier driver F5 RPC 2 failed off. |

| | | | 5P | ACE SHU | JIILE | MI2 | 510 | NS 50 | IVIIVI | ARY | Fage 2-109 - 313-90 |
|--|---|--|--|--|--|---|---------------------|--|---------------|--|--|
| FLT NO. | ORBITER | CREW (7) TITLE, NAMES & EVA'S | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS | SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N. | SRB RSRM AND ET | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-90 SEQ FLT #90 KSC-90 PAD 39B-38 MLP-2 | OV-102 (Flight 25) Columbia 23 RD Spacelab Flight LM-16 EDO 13 OMS PODS: LP05-14 RP05-13 FRC2-25 | PLI: Scott D. Allman P526/R237/M207 M/S 1 (PAYLOAD CDR): Richard M. Linnehan (Fit 2 - STS-78) P527/R214/V150/M187 M/S 2: Kathryn P. Hire P528/R238/F31 M/S 3: Dafydd R. Williams (Canada) P529/R239/M208 P/S 1: Jay C.Buckey, Jr. P530/R240/M209 | KSC 39B 107:18:18:59.99Z 2:19:00 PM EDT (P) 2:19:00 PM EDT (A) Friday 17 4/17/98 (13) LAUNCH WINDOW: 2H30M Neurolab Crew Circadian Constraint EOM PLS: KSC TAL: BEN TAL WX: MRN, ZZA SELECTED: RTLS: KSC 15/CI/N TAL: BEN 36/N/N AOA: EDW 22/N/N PLS: EDW 22/N/N TDEL: 0.08 0.322/0.36 MAX Q NAV: 694 697 SRB STG: 2:05.1 2:05 PERF: NOMINAL 2 ENG TAL (BEN): 2:50 2:49 NEG RETURN: | VEL: 167 KGS 161 KEAS HDOT: -4.6 FPS BRK INIT: 122 KGS DRAG CHUTE JETTISON: 56 KGS 123:16:09:37Z | 104/104/ 109% PREDICTED: 100/104/104 67/104 ACTUAL: 100/104/104 69/104 1 = 2041 (4) 2 = 2032 (7) 3 = 2012 (21) M 3 EOM: WEIGHT: 233031 LBS X CG: 1080.33 LANDING: WEIGHT: 232979 LBS X CG: 1081.94 | BI-094 RSRM 65 ET-91 LWT-84 ET RPT: 283K ET BRKUP: 215K ET IMPACT 1:24:30 MET LAT: 1.88°N LONG: 139.9°W | 39° (7) | DEORBIT: 154 X 138 NM DEORBIT: 149 X 131 NM VELOCITY: 25758 FPS ENTRY RANGE: 4422 NM | Ol-26B (1) | CARGO: 35549 LBS PAYLOAD CHARGEABLE: 25625 LBS DEPLOYED: 0 LBS NON-DEPLOYED: 9944 LBS MIDDECK: 2340 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 348511 LBS NON-DEPLOYED: 1325532 LBS CARGO TOTAL: 2712754 LBS PERFORMANCE MARGINS (LBS): FPR: 3085 FUEL BIAS: 853 FINAL TDDP: 3162 RECON: 1999 PAYLOADS: PLB: NEUROLAB SVF GAS (3) | KSC W/D: OPF 80, VAB 5, PAD 24 = 109 days total. LAUNCH POSTPONEMENTS: - Baselined launch date of 3/18/98 on 1/10/97 Postponed launch date to 4/2/98 on 2/13/98. LAUNCH SCRUBS: - Scrubbed 4/16/98 launch attempt at approximately L-6 hours due to an NSP 2 problem (did not tank). Replaced NSP 2. LAUNCH DELAYS: None TAL WX: - Ben Guerir (prime and selected) was forecast and observed GO. Moron was forecast GO late after ceiling violation, Zaragoza was forecast NO GO for crosswinds and low ceiling, but observed GO at TAL time. DOLILU/I-LOADS: - DOLILU/I-LOADS: - Standard set plus OMS assist is 4000 lbs. FLIGHT DURATION CHANGES: None. Landed on orbit 256. FIRSTS/LASTS: - First use of OMS assist during ascent (102 seconds) 4000 lbs Final flight of Spacelab Total size of the seven crewmembers was the largest Largest number of animals (over 2000 animals on board). EVENTS: - SSME 1 Block IIA and SSME 2 & 3 Phase 2 engines. |
| Crew f left are: I Searfoss | oats as a un Hire/MS, Bud , Pawelczyk/ CSA/MS (to | April - 3 May 1998) - it in Spacelab. From key/PS (top), CDR PS, PLT Altman, p); and Linnehan/PL | 3:56 3:58 PTA (U/S 248): 5:31 5:29 DROOP (ALL): 5:24 5:25 PTM (U/S 390): 7:08 7:11 MECO CMD: 8:27.3 8:28.4 VI: | 11559 FT ROLLOUT: 9998 FT 58 SEC WINDS: T1, L4 KTS 0FFICIAL: 2204P11 T1, L4 KTS DENS ALT: 1560 FT FLT DURATION: | Spacelab S of Neurolab | cience Mo research at botton | odule (c . Tunne | 8 May 1998): Lenter), hosted 1 I from cabin to se and airglow a | l6-days | MIDDECK: BIOREACTOR DEMO. SYSTEM 5 CRYO TK SETS + 4 EDO & 5 N2 TANKS | RADIATOR DEPLOY #22: Port radiator only. SIGNIFICANT ANOMALIES: - Water spray boiler 3 failed to cool, APU3 shutdown at 13:05 MET. Also failed to cool during FCS C/O, so was not started until TAEM for entry Icing in topping FES core (did FES core flush) CO2 removal system failure. RCRS recovered with IFM Waste water dump clogged filter. IFM preformed but urine filter clogged APU 2 Gas Gen/Fuel Pump B heaters failed DOLILU processor integrity rule violation at L-6.5 hours. |

| No No No No No No No No | | | | OI . | ACE SHU | | IVIIO | 310 | 143 30 | IAIIA | | Fage 2-110 - 313-91 |
|--|--|--|---|--|---|---|--|---------------------------------------|--|------------------------|---|--|
| CPR FLT NO. | ORBITER | 6 UP, 7 DOWN | LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | EMERG THROTTLE PROFILE | RSRM AND | | | FSW | · | (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS. |
| top, from left, DLT. Gorie Lawrence/MS. Illsed to check out 1. Intusters R2U and E2U failed off at first command tiring of both 1. | SEQ FLT #91 KSC-91 PAD 39A-53 MLP-1 STS09 060 (2- 1998): seen du flyaroui | (Flight 24) Discovery Spacehab 10 OMS PODS: LPO1-27 RPO3-24 FRC3-24 1-707- 12 June MIR as uring final nd by | CDR: Charles J. Precourt (Fit 4 - STS-55, STS-71, STS-84) P532/R161/V118/M141 PLT: Dominic L. Gorie P533/R242/M211 M/S 1 (PAYLOAD CDR): Franklin R. Chang-Diaz (Fit 6 - STS 61-C, STS-34, STS-46, STS-60, STS-75) P534/R89/V46/M81 M/S 2: Wendy B. Lawrence (Fit 3 - STS-67, STS-86) P535/R192/V146/F25 M/S 3: Janet L. Kavandi P536/R243/F32 M/S 4: Valery V. Ryumin (Russia) P537/R244/M212 M/S 5: Andrew Thomas (Fit 2 - STS-77) P538/R213/V149/M186 Launch on STS-89, stay on Mir 24 and 25, return on STS-91. MCC WHITE FCR (21) FLIGHT DIRECTORS: A/E - N. W. Hale LD/O 1 - P. F. Dye O 2 - A. F. Algate PLNG - P. L. Engelauf MOD - A. L.Briscoe | 6:06:24 EDT (A) Tuesday 13 6/2/98 (9) LAUNCH WINDOW: 7M42S USING MIR PLANAR/ PHASING WINDOW IN LIEU OF PLT. EOM PLS: KSC TAL: ZZA TAL WX: MRN, BEN SELECTED: RTLS: KSC 15/N/N/S TAL: ZZA 30/N/N AOA: KSC 15/N/N PLS: EDW 22/N/N TDEL: 0.04 0.082/0.12 MAX Q NAV: 692 663 SRB STG: 2:03.4 2:03 PERF: NOMINAL 2 ENG TAL (AAZ): 2:34 2:29 NEG RETURN: 4:00 4:02 PTA (U/S 274): 4:45 4:42 DROOP (ZZA): 5:30 PTM (U/S 780): 6:16 6:16 MECO CMD: 8:29.4 8:30.2 VI: 25931 25924 OMS-2: 44:11 44:11 161 FPS 161 FPS | KSC 15 (KSC 44) 163:18:00:17Z 2:00:17 PM EDT Friday 11 6/12/98 (4) DEORBIT BURN: 163:16:52:26Z XRANGE: 317 NM ORBIT DIR: AL 21 AIM PT: NOMINAL MLGTD: 1218 FT 163:18:00:17Z VEL: 215 KGS 207 KEAS HDOT: -3.4 FPS TD NORM 195: 2366 FT DRAG CHUTE DEPLOY: 162 KEAS 163:18:00:27Z NLGTD: 4518 FT 163:18:00:27Z VEL: 176 KGS 167 KEAS HDOT: -6.6 FPS BRK INIT: 147 KGS DRAG CHUTE JETTISON: 57 KGS 163:18:00:58Z BRK DECEL FPS²: AVE 4.7 PK 11.2 WHEELS STOP: 163:18:01:28Z 11935 FT ROLLOUT: 10717 FT 71 SEC WINDS: T3, L6 KTS OFFICIAL: 0407P11 T2, L7 KTS DENS ALT: 2260 FT FLT DURATION: 9:19:53:53 S/T: 781:05:24:20 OV-103: 177:16:47:42 | 104/104/ 109% PREDICTED: 100/104/104/ 67/104 ACTUAL: 100/104/104/ 67/104 1 = 2047 (1) 2 = 2040 (4) 3 = 2042 (3) Block IIA 2047 Throttled to 104.5 M.3 EOM: WEIGHT: 226968 LBS X CG: 1079.49 LANDING: WEIGHT: 226872 LBS X CG: 1081.09 STS091-IBOttom, fi Kavandi/I top, from Thomas/I 4 months | RSRM 66 ET-96 SLWT-1 ET PRED RPT: 283K ET BRKUP: 215K ET IMPACT 1:26:24 MET LAT: 2.68°S LONG: 127.2°W 718-010 rom left, MS, & Cleft, PLTMS & Rystay Th | 98) CDR F hang-E Gorie rumin/N omas N | DEORBIT: 204 X 187 NM VELOCITY: 25889 FPS ENTRY RANGE: 4418 NM Crew portra Precourt, Diaz/PLC. At, Lawrence/MS(RSA). A | (2) | 35549 LBS PAYLOAD CHARGEABLE: 25625 LBS DEPLOYED: 2419 LBS NON-DEPLOYED: 2 LBS MIDDECK: 891 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 1348738 LBS CARGO TOTAL: 2748303 LBS PERFORMANCE MARGINS (LBS): FPR: 3783 FUEL BIAS: 720 FINAL TDDP: 631 RECON: 403 PAYLOADS: PLB: ODS SHUTTLE/MIR MISSION 9 SPACEHAB (Single Module) AMS, SEM (2), GAS (6) MIDDECK: SSCE SIMPLEX CPCG 5 CRYO TK SETS 5 N2 TANKS RMS 50 USed to check out S.N. 201 With new | LAUNCH POSTPONEMENTS: - Baselined launch date of 5/28/98 EDT (5/29/98 GMT) on 2/20/97 Changed launch date to 5/28/98 EDT (5/29/98 GMT) on 8/25/97 Postponed launch date to 6/2/98 to allow AMS additional time. LAUNCH SCRUBS: None LAUNCH WINDOW: - 7M42S based on Mir planar/phase window (not PLT) to increase LO2 drainback time. LAUNCH DELAYS: None TAL WX: - ZZA prime and selected ZZA, MRN, and BEN were forecast and observed GO. DOLILU/I-LOADS: - DOLILU/I-LOADS: - DOLILU/I II uplink #22, I-Load uplink #41. PERFORMANCE ENHANCEMENTS: - Standard set plus MECO altitude is 52 NM, plus Delta psi First use of MECO is 52 NM. FLIGHT DURATION CHANGES: - None. Landed on orbit 155. FIRSTS/LASTS: - First flight of Super Light Weight tank - First flight of Block IIA SSME 2047 - Last Shuttle flight to Mir (ninth docking). EVENTS: - Valery Ryumin's previous flights were Soyuz-25, Soyuz/Salyut-6 (2 flights) WRAP DAP entry Andrew Thomas, last American to visit Mir. Andy transferred to STS-91 from Mir at 155:18:33:24Z. Mir time is 129:02:42:09 and total flight time is 140:15:11:45. RENDEZVOUS #42: - Rendezvous and docking with Mir. SIGNIFICANT ANOMALIES: - Center SSME PC sensor failure Fuel cell 3 overboard relief Fuel cell monitoring time word problem. |
| 11.61 EDC 16.1 EDC 16.1 EDC 17.1 (11.03.24.20 17.1 | | T | | 161 FPS 161 FPS | OV-103: 177:16:47:42 DISTANCE: 3,800,000 sm | Thomas/I | MS & Ry stay Th | vumin/N omas v | NS(RSA). A | /MS, Used to check out | Jets (low chamber pressures). - LOMS ball valve I failed open. | |

| Column | | | | Oi / | ACE SHU | | | | | 11/ | | |
|--|--|---|---|--|---|--|---|-------------------------------------|--|---------|--|---|
| ## FIRSTS, SIGNIFICANT MOMANIES, ET FIRSTS, SIGNI | FLT | ORBITER | | | RUNWAY, | NOM- ABORT | RSRM | (| ORBIT | FSW | | |
| Control Cont | NO. | | TITLE, NAMES & EVA'S | | FLT DURATION, | PROFILE | | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| Parazynski/MS, & Sen. Glenn/PS. Continued Continued Continued | SEQ FLT #92 KSC-92 PAD 39B-39 | (Flight 25) Discovery OMS PODS: LPO1 - 28 RPO3 - 26 | Curtis L. Brown (Flt 5 - STS-47, STS-66, STS-77, STS-85) P539/R152/V112/M136 PLT: Steven W. Lindsey (Flt 2 - STS-87) P540/R229/V131/M200 M/S 1: Stephen K. Robinson (Flt 2 - STS-85) P541/R222/V152/M196 M/S 2: Scott E. Parazynski (Flt 3 - STS-66, STS-86) P542/R187/V145/M164 M/S 3: Pedro Duque (ESA-Spain) P543/R245/M213 P/S 1: Chiaki Mukai (Japan) (Flt 2 - STS-65) P544/R181/V153/F23 P/S 2: Senator John H. Glenn (2) P545/R246/M214 MCC WHITE FCR (22) FLIGHT DIRECTORS: A/E - L. J. Ham LD/O1 - P. L. Engelauf O 2 - P. S. Hill O 3 - P. F. Dye | 302:19:19:33:98Z 2:00:00 PM EST (P) 2:19:34 PM EST (A) Thursday 28 10/29/98 (10) LAUNCH WINDOW: 2H30M CTOB EOM PLS: KSC TAL: BYD TAL WX: BEN, MRN SELECTED: RTLS: EDW 15/N/SF TAL: BYD 32/N/SF AOA: EDW 22 PLS: EDW 22/CI/N TDEL: -0.03 -0.108/0.07 MAX Q NAV: 755 765 SRB STG: 2:03.7 2:03 PERF: NOMINAL 2 ENG TAL (BYD): 2:11 2:13 NEG RETURN: 3:45 3:52 PTA (U/S 500): 4:12 4:08 DROOP: 5:21 PTM (U/S 500): 5:13 5:06 MECO CMD: 8:20.7 8:21.6 VI: 26102 26092 OMS-2: 41:57 41:57 | KSC 33 (KSC 45) 311:17:03:30Z 12:03:30 PM EST Saturday 20 11/7/98 (11) DEORBIT BURN: 311:15:52:54Z XRANGE: 172 NM ORBIT DIR: DL 44 AIM PT: NOMINAL MLGTD: 3243 FT 311:17:03:30Z VEL: 199 KGS 196 KEAS HDOT: -1.0 FPS TD NORM 205: 2559 FT DRAG CHUTE DEPLOY: NOT USED NLGTD: 6248 FT 311:17:03:40Z VEL: 164 KGS 164 KEAS HDOT: -6.6 FPS BRK INIT: 138 KGS 8726 FT DRAG CHUTE JETTISON: NOT USED BRK DECEL FPS ² : AVE 5.8 PK 7.8 WHEELS STOP: 311:17:04:30Z 12751 FT ROLLOUT: 9508 FT 60 SECS WINDS: OH, 10R KTS OFFICIAL: 0609P14 TO, R9 KTS | 104.5/104.5/ 109% PREDICTED: 100/104.5/ 104.5/67/ 104.5/67/ 104.5 ACTUAL: 100/104.5/ 104.5/72/ 104.5 1 = 2048 (1) 2 = 2043 (2) 3 = 2045 (2) ALL BLOCK II A ENGINES M 3 EOM WEIGHT: 228455 LBS X CG: 1076.83 LANDING: WEIGHT: 228388 LBS X CG: 1078.45 | RSRM 68 ET-98 SLWT-2 SLWT RPT MAX: 283K MIN: 215K SLWT IMPACT 1:28:02 MET LAT: 20.8°N LONG: 147.2°W | t7 Nov. 1 LT Lindse ukai/PS/N | INSERTION POST OMS-2: 303 X 295 NM SEP 1: 2:23:46:30 MET 302.2 X 294 NM SEP 2: 3:06:16:40 MET TI:5:22:01:37 MET 301.5 X 293.5 NM DEORBIT ALT: 301.5 X 285.9 NM VELOCITY 26063 FPS ENTRY RANGE 4290 NM | OWN (3) | 38618 LBS PAYLOAD CHARGABLE: 28520 LBS DEPLOYED: 125 LBS NON-DEPLOYED: 24108 LBS MIDDECK: 1314 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 850155 LBS NON-DEPLOYED: 1378355 LBS CARGO TOTAL: 2824652 LBS PERFORMANCE MARGINS (LBS): FPR: 3783 FUEL BIAS: 720 FINAL TDDP: 1587 RECON: 2740 PAYLOADS: PLB: SPACEHAB (Single) HOST SPARTAN-201 (Deploy & Retrieve) (Solar Wind Exp.) GAS (2) IEH-3 (PANSAT) (Deployed) MIDDECK: PCG-STES SAREX-II BRIC 5 CYRO TK SETS 5 GN2 TANKS | LAUNCH POSTPONMENTS: - Baselined launch date of 10/8/98 on 7/31/97 Postponed launch date to 10/29/98 on 12/18/97. LAUNCH SCRUBS: None LAUNCH DELAYS: - Held for 9 minutes 36 seconds during T-9 minute hold to understand the cause of the three master alarms (MA) during cabin leak checks. First MA was cabin P reached 15.35 psi during cabin leak checks. Two MA's were differential pressure/differential time alarms. It was concluded that the alarms were expected and count was resumed Held for 9 minutes 58 seconds at T-5 minutes for range safety hold call for two intruder aircraft in Launch Danger Area. Resumed count but two calls were made to hold at T-31 seconds, one for engine 2 pitch position NO GO and the second for range safety NO GO. These holds were removed before count reached T-31 seconds; hence, no additional delay. TAL WX: - Banjul, Ben Guerir, and Moron were forecast and observed GO. Banjul was prime and selected. DOLILU/I-LOADS: - DOLILU II uplink # 23, I-Load uplink # 42. PERFORMANCE ENHANCEMENTS: - Standard set plus PE High Q. FLIGHT DURATION CHANGES: None FLIGHT RULE WAIVER: - Forecast at deorbit burn time was a maximum crosswind of 16 knots. Flight rule limit is 15 knots. Observed crosswind < 10 knots. Landed on orbit 135. FIRSTS/LASTS/RECORDS: - First flight using High Q flight design First flight with three Block IIA SSME's (Rocketdyne HPFTP). John Glenn's first flight was Mercury-Atlas 6 on 2/20/62 Glenn's age at first flight 40Y7.5M, second flight 77Y4M, 36Y8.5M between flights First flight using space-to-space comm system (as DTO) Second flight of Super Lightweight Tank (SLWT). |

SRB

RSRM

AND

ET

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, |
|---------------------|---------|-------------------------|-------------------------------|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES |
| STS-95 Continued | | | |





S62-00303 (2-20-62): Lt, John Glenn 1st american to orbit Earth, Friendship7/MA6. STS095-E-5032 (10-29-98): Rt, Sen. John Glenn, at 77, oldest human in space, STS-95.



98-E-03312 (14 April 1998) --- President Bill Clinton (at lectern) addresses JSC employees. Seated behind him (from left): JSC Director George W.S. Abbey, U.S. Rep. Nick Lampson (D.-TX), NASA Administrator Daniel Goldin and Houston Mayor Lee Brown. Standing are STS-95 crew: (from left) Pedro Duque, Chiaki Mukai, U.S. Sen. John H. Glenn Jr. (D.-Ohio), Stephen K. Robinson, Scott E. Parazvnski. PLT Steven W. Lindsev & CDR Curtis L. Brown.

RUNWAY, CROSSRANGE

LANDING SITE/

LANDING TIMES FLT DURATION, WINDS

Continued...

DENS ALT: 965 FT FLT DURATION: 8:21:43:56

S/T: 790:03:08:16

<u>OV-103</u>: 186:13:31:48

<u>DISTANCE</u>: 3,644,459 sm

SSME-TL NOM-**ABORT EMERG** THROTTLE **PROFILE** ENG. S.N.

ORBIT HA/HP

FSW EXPERIMENTS

PAYLOAD WEIGHTS. PAYLOADS/

MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS,

TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

Continued... Continued...

RMS 51 (S.N. 201) RMS used for SPARTAN-201 deploy, retrieve and berth, ACVS, OSVS, and VGS OPS.

SPARTAN-201 release 305:19:00:12Z, 2:23:40:36

Due to drag chute anomaly, drag chute was not armed and deployed.

Inert weight adjustment -200 lbs included in STS OPR chargeable.

- SPARTAN capture 307:20:47:49Z, 5:01:28 MET. Berth 5:01:46 MET.

RENDEZVOUS # 43:

- Deployed, separated, rendezvoused with SPARTAN-

RADIATOR DEPLOY # 23
- Both port and starboard panels deployed.

SIGNIFICANT ANOMALIES:

Low lodine Residual System (LIRS) large spraying leak. Used backup galley iodine removal system.

 Unpleasant taste (rubber hose) from LIRS.

- During space-to-space comm tests, no data from EMU 1 in primary.

- Drag chute door fell off during ME throttle up at T-5 seconds; hence, not deployed during landing.

Decision made to disable chute for STS-88.

WSB 2 overcooled six times during entry.

SPARTAN ground command problem.

RCS jet L3L failed off, then failed leak.



S98-16165 (10-29-98) --- In MCC: From left, CAPCOMS Susan Still &, Scott J. Horowitz: & Flight Directors Jeffrev W. Bantle, Linda Ham and Wayne Hale following launch of STS-95.

STS095-E-5077 (11-01-98)- Spartan201-05 departs discovery as a free flyer for several days recording solar wind and sun corona data.

| CREW LURCH VIEW LANGEST STATE LANGEST | | | | 01 / | CL 3110 | | 11001 | 0110 | COMIN | ///\\ | <u> </u> | |
|---|--|--------------|------------------------------|--------------------------------|-----------------------------|---|----------------|-----------|--|--------|----------------------------|--|
| ## 10 ORTER ## 10 ## 17 ORTER ## 20 ## 10 | | | CREW | | LANDING SITE/ | SSME-TL | 0.00 | | | | 5.0.// 6.45 | |
| TITLE NAMES LANGER SHOWN THESE LANGER SHOWN THE SHOWN | EL T | ODDITED | | | | | | (| JRBH | FOW | | |
| 11.5 20.0 11.5 11.5 12.5 | | ORBITER | ` ′ | | | | | | 110 (115 | FSW | WEIGHTS, | |
| ST-S-88 | NO. | | TITLE, NAMES | | | | | INC | HA/HP | | | |
| \$15.58.0 (AV) (19) (19) (19) (19) (19) (19) (19) (19 | | | & EVA'S | ABORT TIMES | | PROFILE | EI | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| SS-24 Files 13 | OTO 00/ | OV 105 | CDD | NCC 30 DVD V | VSC 15 (VSC 46) | | DI 005 | 51.60 | DIDECT | OI 26D | CARCO | Drief Mission Commons, The CTC 00/24 III Inited |
| Finds SS SS SS A A | | (Flight 13) | | | 350:03:53:307 | | DI-093 | | INSERTION | | | BITEL MISSION SUMMARY: The STS-88/ZA UNITY |
| ST-SCA ST-S | | | | 3:35:34 AM EST (P) | | 1 | RSRM | (-) | | (- / | | |
| SCO TLT 193 Preferrick W. Standow Psychological Psycholo | | | | 3:35:34 AM EST (A) | | PREDICTED | 67 | | POST OMS-2 | | <u>PAYLOAD</u> | already launched Zarva control module and |
| SEC PET PSP MS PSP P | Flight to ISS | | P546/R113/V84/M101 | Friday 18 | Tuesday 14 | | FT 07 | | 1/5 X 9/ NM | | | |
| Figure F | CEO ELT #02 | OMS PODS | DI T· | 12/4/98 (5) | 12/15/98 (10) | | E1-97 | | DEDI OV: | | 30980 FR2 | |
| ## P5-17-17 | SEQ FLI #93 | LPO4-20 | | LAUNCH WINDOW | DEORBIT BURN: | 104.5 | SLWT-3 | | DELLEGT. | | DEPLOYED: | |
| ## SLEV1: Smart Phase Smar | NCC 03 | RPO1-27 | | 4M59S Based on | 350:02:48:04 | | | | | | 26791 LBS | |
| PAD Plant | K3C-93 | FRC5-13 | | Preferred Launch | 340 FPS | | SLWT | | SEP BURN: | | NON-DEPLOYED: | KSC W/D: OPF 187, VAB 5, PAD 37 = 229 days |
| SAMILP 3 | DVD | | M/S I/EV I: | | VDANCE, 124 NM | | 1202K | | | | | LAUNCH DOCTDONEMENTS: |
| STS-27, STS-58, ASTS-70 PSIBRIVISIANION NS.2. Nancy J. Curie (Fit 3. STS-57, STS-70) PSIBRIVISIANION NO.5 SC 33NN NO.5 NN NO.5 SC 33NN NO.5 SC 33NN NO.5 NN NO.5 SC 33NN NO.5 NN NO.5 SC 33NN NO.5 NN | 30Δ-54MI D-3 | | | Pidiidi/PiidSe. | ARANGE, 134 INIVI | | 203K | | | | MIDDECK. | |
| Pst/9R69/V39/M0 TAL XZ ARN, BEN MPT: NOMINAL MS MS TAL YZ ARN, BEN MPT: NOMINAL MS MS TAL YZ ARN, BEN MS TAL YZ ARN, TAL YZ ARN, BEN MS TAL YZ ARN, TAL YZ | 37A-34IVILI -3 | | STS-37, STS-55, &STS-74) | EOM PLS: KSC | ORBIT DIR: AL 22 | 2 = 2044 (2) | SLWT | | | | MIDDECK: 1122 I BS | |
| MS 2 MS 1 MS 2 MS 1 MS 2 | | | | TAL: ZZA | | 3 = 2041 (5) | BR/UP | | RCS-2 | | 1122 LD3 | |
| Marcy J. Curile (File S. STS-57) PS-98/RIGN/V20F21 All MR3 20ANN DATE of the company of | | | MICO | <u>TAL WX</u> : MRN, BEN | <u>aim Pt</u> : Nominal | | 207K | | 0011101011 | | <u>SHUTTLE</u> | · |
| ## 3.5TS.7, ST.5.70 ## 3.5TS.7, ST.5.70 ## 3.5TS.1, ST.5.69 ## 3.5TS. | | | M/S Z: | SELECTED: | MI CTD: 2162 ET | | | | AVOIDANCE | | | LAUNCH SCRUBS: |
| P549R1650/120F21 ALL MRN 20/NN AQA KS2 S2 S3 NN AQA KS2 S3 S4 S5 S5 S5 S6 S6 S6 S6 S6 | | | (Flt 3 - STS-57, STS-70) | RTLS: KSC 33/N/N | 350:03:53:307 | IIA SSME'S | | | AVOIDANCE | | | - Scrudded 12/3/98 launch attempt after LO ₂ graindack |
| MS 9/EV 2 James H. Newman (ITLS - SITS-SI, STS-69) PSS/RTS69/IV26/IV26/IV26 MS 4 Segle Krikley (Russia) (Russia | | | | | | | | | | | 877846 LRS | time (PLT) 5-minute window (LO ₂ drainback hold time |
| MS 9RV James H. Newman (R13 - STS-51, STS-69) P550R168V122M140 John School J | | | | AOA: KSC 33 | 197 KEAS | | | | | | NON-DEPLOYED: | was 5M19S based on T-0 at PLW opening and 3M42S |
| The content of the | | | | PLS: KSC 33/N/N | HDOT: -2.3 FPS | | | X. | | | 1378355 LBS | nominal T-0 at PLT). The Planar Launch Window was |
| ## PS-SURTRORY12/M146 ## AX O NAV 77 ## AX 19 | | | | TDEL: | TD NODM 105: | 55/0 | | | | | CARGO TOTAL: | 7M48S (opened at 337:08:55:31 and closed at |
| MS 4: Sergel Krikalev (Russia) (Fil 2 - ST5-60) (Fil 2 - | | | | -0.15 -0.008/-0.03 | 3293 FT | | | 450 | | | 2824652 LBS | 337:09:03:19). Opted for use of the Preferred Launch |
| Sergel Krikalev (Russia) (FI2 - 515-60) P55TR/T6V/154M154 SER SIG: 205.3 2.05 SER SIG: 205.3 2.05 SER SIG: 205.3 2.05 SER SIG: 205.3 2.05 Service for the first of the first o | | | | | | A TOP | | | The state of the s | \ \ | PERFORMANCE | |
| (Russia) (FIt 2- STS-60) (FS51/R176/V154/M154 SR STG: 2.05.3 2.05 NIGTD- 6009 FT 350.03.53.382 PERF. NOMINAL 2.05.3 2.05 NIGTD- 6009 FT 350.03.53.382 VEL: 164 KCS 2.25 2.25 VEL: 164 KCS 2.25 VEL: 164 K | | | | | DRAG CHUTE | | | S WILL | | \ | MARGINS (LBS): | |
| CFI12_STS-60 PS51/R176/V154/M154 SRB_STIG: 2.05.3 2.05 SUBJECT: 2.05.3 2.05 SUBJEC | | | Sergei Krikalev | 707 715 | DEPLOY: | | | F | | \ | FPR: 3783 | caused an automatic hold at T. 4 minutes. After holding |
| PS5 INT/36/VI54/M154 Z-05-3 Z-05 Z-0 | | | (RUSSIA) (FIt 2 - STS-60) | SRR STG- | | | | | | 1 | FUEL BIAS: 720 | |
| S. EVA #42: EMUT eithered EVA #36 on 12/17/98 Duration 7H21M EVA \$435 Scheduled EVA #36 on 12/17/98 Duration 7H21M EVA \$435 Scheduled EVA #36 on 12/17/98 Duration 7H21M EVA \$437 on 12/19/98 Duration 7H20M EVA \$438 on 12/19/98 Duration 6H59M EVA \$438 on 12/12/98 Duration 6H59M EVEL 164 KGS 158 Capple followed Death of the Maccurred slightly after the expiration of the 3MA2 EVC or draiback bold time. The count was resumed; however, the launch window had expired. Post-light, it was concluded that the most probable cause of the pressure spike was a "Switch fease" which momentarily reenergized the systems 1 hydraulic pump pressure spike was a "Switch fease" which momentarily reenergized the systems 1 hydraulic pump pressure spike was a "Switch fease" which momentarily reenergized the systems 1 hydraulic pump pressure spike was a "Switch fease" which momentarily reenergized the systems 1 hydraulic pump pressure spike was a "Switch fease" which momentarily reenergized the systems 1 hydraulic pump pressure spike was a "Switch fease" which momentarily reenergized the systems 1 hydraulic pump pressure spike was a "Switch fease" which momentarily reenergized the systems 1 hydraulic pump pressure spike was a "Switch fease" which momentarily reenergized the systems 1 hydraulic pump pressure spike was a "Switch fease" which momentarily reenergized the systems 1 hydraulic pump pressure spike was a "Switch fease" which momentarily reenergized the systems 1 hydraulic pump pressure spike was a "Switch fease" which momentarily reenerg | | | P551/R176/V154/M154 | 2:05.3 2:05 | | | | | | | PECON: 1043 | |
| EMUTethered EVA #36 on 12/19/8 Duration 7H21M EVA start at 3D13H34M MET SE KEAS Scheduled EVA #36 on 12/19/8 Duration 7H20M EVA start at 5D11H57M30S MET MILDOL September 4, 138 Se | | | | | NLGTD: 6009 FT | | | 1 | E | | NECON. 1043 | troubleshooting the MA. Resolution of the MA occurred |
| EVA #35 Scheduled EVA #36 on 12/7/98 Duration 7H21M EVA start at 3D13H34M MET See FETURN: 3.55 BK KINT: 135 KGS BTS FT With Man Very Method (Mint) See Feturn (Mint) See Fetur | CTUR | CKO | SS EVA #42: | <u>PERF</u> : NOMINAL | 350:03:53:38Z | | | 1 | - 100 | 1 | PAYLOADS: | slightly after the expiration of the 3M42S LO ₂ drainback |
| Duration 7H21M EVA start at 3D13H34M MET SEVA #43: EMUTethered EVA #36 Substituted EVA #37 on 12/9/98 Duration 7H22M EVA start at 5D11H57M30S MET SEVA #44: EMUTethered EVA #38 on 12/2/98 Duration 7H02M EVA start at 5D11H57M50S MET MECO CMD: SEVA #44: EMUTethered EVA #38 on 12/2/98 Duration 7H52M EVA start at 8D11H57M50S MET MECO CMD: SEVE #44: EMUTethered EVA #38 on 12/2/98 Duration 7H52M EVA start at 8D11H57M50S MET MECO CMD: SEVE #44: EMUTethered EVA #38 on 12/2/98 Duration 7H57M50S MET MECO CMD: SEVE #44: EMUTethered EVA #38 on 12/2/98 Duration 7H57M50S MET MECO CMD: SEVE #44: EMUTethered EVA #38 on 12/2/98 Duration 6H59M EVA start at 8D11H57M50S MET MECO CMD: SEVE #44: EMUTethered EVA #38 on 12/2/98 Duration 6H59M EVA start at 8D11H57M50S MET MECO CMD: SEVE #44: EMUTethered EVA #38 on 12/2/98 Duration 6H59M EVA start at 8D11H57M50S MET MECO CMD: SEVE #44: EMUTethered EVA #38 on 12/2/98 Duration 6H59M EVA start at 8D11H57M50S MET MECO CMD: SEVE #44: EMUTethered EVA #38 on 12/2/98 Duration 6H59M EVA start at 8D11H57M50S MET MECO CMD: SEVE #44: EMUTethered EVA #38 on 12/2/98 Duration 6H59M EVA start at 8D11H57M50S MET MECO CMD: SEVE #44: EMUTethered EVA #38 on 12/2/98 Duration 6H59M EVA start at 8D11H57M50S MET MECO CMD: SEVE #44: EMUTethered EVA #38 on 12/2/98 Duration 6H59M EVA start at 8D11H57M50S MET MECO CMD: SEVE #44: EMUTethered EVA #38 on 12/2/98 BVA start at 8D11H57M50S MET MECO CMD: SEVE #44: EMUTethered EVA #38 on 12/2/98 BVA start at 8D11H57M50S MET MECO CMD: SEVE #44: EMUTethered EVA #38 on 12/2/98 BVA start at 8D11H57M50S MET MECO CMD: SEVE #44: EMUTethered EVA #38 on 12/2/98 BVA start at 8D11H57M50S MET MECO CMD: SEVE #44: EMUTethered EVA #38 on 12/2/98 BVA start at 8D11H57M50S MET MARK camera view). MEG CHUTE SEVE #44: EMUTethered EVA #38 on 12/2/98 BVA start at 8D11H57M50S MET MARK camera view). MEG CHUTE WAS Disable cause of the pressure size which moentarily recenspread to Silver Well of Unity Node & the Russian-built Zarya module MAX camera view). | AL | C | FVA #35 | 2 ENC TAL (77A). | | | | | 是 整 | | PLB: | |
| Duration 7H21M EVA start at 3D13H34M MET SEVEN SET ALL (US 500): 4:48 4:45 EMU/Tethered EVA #37 on 12/19/18 Duration 7H02M EVA start at 5D11H57M30S MET SEVEN #44: 500: 55.7 Scheduled EVA #38 on 12/12/198 Duration 6H59M EVA start at 8D11H57M50S MET Seven #45 EVA #38 on 12/12/198 Duration 6H59M EVA start at 8D11H57M50S MET Seven #45 EVA #38 on 12/12/198 Duration 6H59M EVA start at 8D11H57M50S MET Seven #45 EVA #38 on 12/12/198 Duration 6H59M EVA start at 8D11H57M50S MET Seven #45 EVA #38 on 12/12/198 Duration 6H59M EVA start at 8D11H57M50S MET Seven #45 EVA #38 on 12/12/198 Duration 6H59M EVA start at 8D11H57M50S MET Seven #45 EVA #38 on 12/12/198 Duration 6H59M EVA start at 8D11H57M50S MET Seven #45 EVA #38 on 12/12/198 Duration 6H59M EVA start at 8D11H57M50S MET Seven #45 EVA #38 on 12/12/198 Duration 6H59M EVA start at 8D11H57M50S MET Seven #45 EVA #38 on 12/12/198 Duration 6H59M EVA start at 8D11H57M50S MET Seven #45 EVA #38 on 12/12/198 Duration 6H59M EVA start at 8D11H57M50S MET Seven #45 EVA #38 on 12/12/198 Duration 6H59M EVA start at 8D11H57M50S MET Seven #45 EVA #38 On 12/12/198 Duration 6H59M EVA start at 8D11H57M50S MET Seven #45 EVA #38 On 12/12/198 Duration 6H59M EVA start at 8D11H57M50S MET Seven #45 EVA #38 On 12/12/198 Duration 6H59M EVA start at 8D11H57M50S MET Seven #45 EVA #45 EV | 0. | 1 2 3 | Scheduled EVA #36 on | 2 LING TAL (ZZA). 2·25 2·25 | HDOT: -6.2 FPS | Carl Carl | 周湖 建山西山 | | | | ISS - 2A Node 1/DMA 193 | launch window had expired. Post-flight, it was |
| EVA start at 3D13H34M MET SS EVA #43: | 3 | | 12/7/98 | 2.20 | | c00 0277 | 'O In Do | c 1009 c | scombly of the | _ | | concluded that the most probable cause of the pressure |
| SS EVA #43 SEVA #44: EMU/Tethered EVA #37 ST ST ST ST ST ST ST S | | | | NEG RETURN: | BRK INIT: 135 KGS | 399_0377 | n with the id | nining of | the LLS -built | | ICBC - | reenergized the systems 1 hydraulic nump pressure |
| SS EVA #43: EMU/Tethrerd FVA #36 Scheduled EVA #37 on 12/9/98 Duration 7H02M EVA start at 5D11H57M30S MET Sixpord Sixpor | P | - B | | 3:55 | 8153 F I | Unity Noc | le & the Ru | ssian-bui | It Zarva modu | l a | Mighty Sat | solenoid valve. |
| EVA #36 Scheduled EVA #37 on 12/9/98 Duration 7H02M EVA start at 5D11H57M30S MET MECO CMD: 8:22.8 MET MEGO CMD: 8:22.8 MET MECO CMD: 17.72°N MEGO C | 8 | 45 | <u>SS EVA #43</u> : | PTA (II/S 500)· | DRAG CHUTE | | | | , | 0 | (Deployed) | CHRITTLE MICHT LAUMOLL #20 |
| Scheduled EVA #37 on 12/9/98 Duration 7H02M EVA start at 5D11H57M30S MET Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA #341 MM EVA #343 MM EVA #343 MM EVA #4343 MM | NEWMA | N KPWIT | | | | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | 1 | | | | GAS (1) SEM | SHUTTLE NIGHT LAUNCH #20 |
| DROOP: N/A 5:24 DISABLED. DISABLED. DISABLED. DISABLED. DISABLED. DISABLED. DISABLED. DISABLED. DISABLED. | | | | | CHUTE WAS | M 3 EOM | | | | | RMS, ODS | |
| Duration 7H02M EVA start at 5D11H57M30S MET N/A 5:24 | | | | | DISABLED. | | | | | | | 338:08:35:34Z, 3:35:34 AM EST, on Friday, |
| PTM (U/S 273): 5:56 MET Signal Standard SDTHH57Misos MET Signal | | | Duration 7H02M | IN/A 5:24 | BBK DECEL EDG ^{2,} | | | | | | MIDDECK: | December 4, 1998. |
| SE VA #44: EMU/Tethered EVA #37 Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET MECO CMD: 8:22.8 SEVA #44: EMU/Tethered EVA #37 Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET MECO CMD: 8:22.8 SEVA #44: EMU/Tethered EVA #37 Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET MECO CMD: 8:22.8 SEVA #44: EMU/Tethered EVA #37 Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET MECO CMD: 8:22.8 SEVA #44: EMU/Tethered EVA #38 on 12/12/98 SEVA #44: EMU/Tethered EVA #4: EMU/Tethered | ANDGE TO | HEFIN | | PTM (U/S 273): | | 201538 LBS | | | | | SIIVIPLEX | TAI WX: |
| SS EVA #44: EMU/Tethered EVA #37 Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET MECO CMD: 8:22.8 8:22.6 8:22.6 ROLLOUT: 433 FT 44 SEC WHEELS STOP: 350:03:54:16Z LANDING LAT: 1.72°N LONG: 127:20 WEIGHT: 201492 LBS WEIGHT: 201492 LBS WEIGHT: 201492 LBS ANM VELOCITY 25898 FPS ENTRY RANGE 43:38 43:41 Continued (celling and crosswind), Moron (selected) forecast and observed GO. Ben Guerir forecast NO GO (ceiling & rain) but observed GO. DOLILU-II I-LOADS: - Uplink #24, I-Load uplink #43. Continued (continued | SPACE | TION | MET | 5:57 5:56 | | X CG: | IMPACT: | | <u>DEORBIT</u> | | 5 CYRO TK SETS | |
| VI: 25931 25929 VI: 25898 FPS VI: 25898 FPS VI: 25898 FPS VIII VII | The state of the s | | SS FVA #44· | | WHEELS STOP: | | 1:27:30 | | 213.6 X 208.8 | | | |
| VI: 25931 25929 VI: 25898 FPS VI: 25898 FPS VI: 25898 FPS VIII VII | | | EMU/Tethered | MECO CMD: | | | | | MM | | RMS 52 | |
| Scheduled EVA #38 on 12/12/98 | | | EVA #37 | 0.22.8 8:22.6 | 11000 FT | <u>LANDING</u> | LAT: 1.72°N | | VELOCITY | | RMS used to | rain) but observed GO. |
| EVA start at 8D11H57M50S MET | | | | VI: | ROLLOUT: | WEIGHT: | I ONG: | | | | grapple Node 1 and | DOLILII-ILI-I OADS: |
| EVA start at 8D11H57M50S MET | | | | <u>25</u> 931 25929 | 8343 FT | | | | | | position on ODS. | |
| MET | UNI | TY | | | 44 SEC | | | | | | dock with Node 1 | - h = -0.1 = |
| 103 EDS 103 EDS Continued | | | | UIVIS-2 11G: 12:30 12:41 | | | | | KANGE 1313 NM | | GOOK WILL INDUC 1. | Continued |
| Continuea | | | O and Harris of | | Continued | 1086.18 | | | 4049 ININI | | | - Continuou |
| | | | Continued | 100.10 | | | | | | | | |

| FLT | ORBITER | CREW (6) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | C | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-------------------|---------|-------------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-88/ ISS-2A | | Continued MCC WHITE FCR (23) | | Continued WINDS: | | | | | 19 | | Continued PERFORMANCE ENHANCEMENTS: |

ISS-2A Continued

FLIGHT DIRECTORS: A/E/O 4 - J. P. Shannon LD/O 1 - R. E. Castle O 2 - P. L. Engelauf

Plng/O 3 - A. F. Algate MOD - J. W. Bantle ISS LD/O 2 - M. A. Kirasich ISS/O 1 - S. P. Davis ISS/Plng/O 3 - J. M. Hanley <u>WINDS:</u> 5T, 1R KTS OFFICIAL: 3105P09 R2, T5 KTS

DENS ALT: -854 FT FLT DURATION:

S/T: 801:22:26:12

OV-105: 133:04:07:58

11:19:17:56

DISTANCE: 4,650,000 sm



STS088-370-006 --- Crew in U.S. -built Unity Node: Bottom row (left to right) are PLT Sturckow, CDR Cabana, & Currie/MS. Top row, Krikalev/MS (Russia), Newman/MS, & Ross/MS.





BELOW: 98e09779 In MCC on console: Scott Altman, Dominic Gorie, & Scott Horowitz.

STS088-E-5059 (12-08-98) --- Newman (left) & Ross mated 40 cables & connectors running 76 ft between Zarya & Unity (foreground).



SIGNIFICANT ANOMALIES:

- Gallev iodine removal assembly hose QD incompatibility.
- Five PLB floodlights failed.Anomalous SAFER S/N 1007 GN2 and tank pressure reading.
- GPS anomalies.
- APU 2 fuel pump drain line pressure decay.
- RCS jet R2D fail leak.
- Right Pad A heater circuit failure.
- Right RCS 1/2 tank isolation valves fail open.
- Right inboard tire pressure indication failed low.
- Failed portable foot restraint attachment device hatch pin came out, then broke.



STS088-703-032 --- Blanketing clouds form the backdrop for the connected Zarya and Unity modules after release from Endeavour's cargo

PERFORMANCE ENHANCEMENTS:

Standard set plus PE High Q WIN/DEC, OMS assist 4000 lbs. 52 NM MECO, and Del Psi.

FLIGHT DURATION CHANGES: None

FIRST<u>S/LASTS</u>:

- First Shuttle flight to International Space Station (FGB), docked node to PMA/FGB.
- First ISS assembly flight.

SHUTTLE NIGHT LANDING #10

Landed on orbit 186 on KSC 15.

- STS-88/2A first International Space Station (ISS)
- assembly flight carried NODE, Unity.
 First ISS element, the FGB Zarya, was launched from Baikonar Cosmodrome by a PROTON at 324:06:40:006Z into an orbit of 191.4 X 100 NM at inclination of 51.62
- STS-88/2A was the first rendezvous and docking of the ISS Program.
- 13.5 Frogram:

 RMS grapple of PMA-1/Node 1/PMA-2 at
 339:21:54:19Z, unberth at 339:22:08:10Z, installed on
 ODS at 339:23:52:40Z, ungrapple at 340:00:09:30Z.

 RMS grapple of FGB at 340:23:47:02Z, FGB
 ungrapple at 341:02:43:52Z.

 EVA 1 start at 341:22:09:51Z, end at 342:05:30:42Z,
- duration 7H21M51S.
- ISS reboost burn start at 342:20:35:34Z, duration___.
 EVA 2 start at 343:20:33:04Z, end at 344:03:34:34Z, duration 7H01M30S.
- Node 1 (Unity) ingress at 344:19:54Z, FGB ingress at 344:21:11Z.
- EVA 3 start at 346:20:33:24Z, end at 347:03:32:01, duration 6H58M37S.

- SAC-A deployed at 9:20:15 MET.
 Mighty SAT deployed at 10:17:13 MET.
 Drag Chute was disarmed pending resolution of STS-95 Drag Chute door anomaly. (Mortar was removed.)
 Undock at 347:20:24:34Z.
- ISS Visitor time 6D17H34M20S

RENDEZVOUS #44

Rendezvous and dock with ISS PMA 2 Node 1 forward port.

| | | | O | ICL SITU | | | | | ••• | | |
|---------|--|---|---|---|---|-------------|----------|--|--------|---|--|
| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM- ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| PAYETTE | T HUSBAND TOKAPEB CHOA BARRY CTORS: n Hale Reeves iantle S. Hill Kirasich | CDR: Kent Rominger (Flt 4 - STS-73, STS-80, STS-85) P552/R200/V131/M174 PLT: Rick D. Husband P553/R248/M216 M/S 1/EV 1: Tamara E. Jernigan (Flt 5 - STS-40, STS-52, STS-67, STS-80) P554/R130/V83/F14 M/S 2: Ellen Ochoa (Flt 3 - STS-56, STS-66) P555/R160/V113/F20 M/S 3/EV 2: Daniel T. Barry (Flt 2 - STS-72) P556/R209/V155/M182 M/S 4: Julie Payette (Canada) P557/R249/ F33 M/S 5: Valery Tokarev (Russia) P558/R250/M217 SS EVA #45: EMU/Tethered EVA #38 on 5/29/99 Scheduled EVA #39 ISS EVA #4 7H55M Duration | SRB STG: 2:05 2:04.6 2:05 PERE: NOMINAL 2 ENG TAL (MRN): 2:17 2:21 NEG RETURN: 3:57 PTA (U/S 272): 4:24 DROOP (ZZA): 5:22 5:30 5:39 SE TAL (ZZA): 5:52 SE PTM: 6:48 1:50.0 CMB 6:48 | KSC 15 (KSC 47) 157:06:02:43 Z 02:02:43 AM EDT Sunday 14 6/6/99 (5) DEORBIT BURN: 157:04:54:09Z XRANGE: 712 NM ORBIT DIR: AL 23 AIM PT: CLOSE IN MLGTD: 1963 FT 157:06:02:43Z VEL: 210 KGS 210 KEAS HDOT: -1.0 FPS TD NORM 205: 2290 FT DRAG CHUTE DEPLOY:184 KEAS 157:06:02:51Z NLGTD: 6504 FT 157:06:02:51Z NLGTD: 6504 FT 157:06:02:57Z VEL: 156 KGS 149 KEAS HDOT: -5.8 FPS BRK INIT: 112 KGS DRAG CHUTE JETTISON: 53 KGS 157:06:03:18Z BRK DECEL FPS ² : AVE 7.1 PK 9.0 WHEELS STOP: 157:06:03:35Z 10829 FT ROLLOUT: 8866 FT 52 SECS WINDS: 2H, 5L KTS OFFICIAL: 0904P07 2H, 3L KTS | 104/104/ 109% PREDICTED: 100/104.5/ 104.5/72/ 104.5 5 ACTUAL: 100/104.5/ 104.5/72/ 104.5 1 = 2047 (2) 2 = 2051 (1) 3 = 2049 (1) ALL BLOCK IIA SSME'S STS096-E Rick Husb | | ls thumb | DIRECT INSERTION POST OMS-2: 182.7 X 177.1 NM TI: 149:01:35:18Z MET 208.3 X 202.4 NM MC4: 149:02:55:18Z 209.3 X 208.4 NM REBOOST: 154:09:36:53Z 213.9 X 208.6 NM DEORBIT: 213.9 X 208.6 NM ENTRY VELOCITY 25915 FPS ENTRY RANGE 4358 NM | Pilot, | CARGO: 33808 LBS PAYLOAD CHARGABLE: 22707 LBS DEPLOYED: 4228 LBS NON-DEPLOYED: 17994 LBS MIDDECK: 1034 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 139783 LBS CARGO TOTAL: 2858460 LBS PERFORMANCE MARGINS (LBS): FPR: 3783 FUEL BIAS: 720 FINAL TDDP: 4435 RECON: 4306 PAYLOADS: PLB: ISS 2A.1 SPACEHAB (Double Module) ODS, OTD STARSHINE (DEPLOYED) SVF ICC MIDDECK: DTO EMU H/W EMU TOOLS 5 CYRO TK SETS 5 GN2 TANKS RMS 53 (S.N. 303) Continued | Brief Mission Summary: The major objective of STS-96-2A.1, 2nd ISS mission, was to transfer nearly 2 tons of logistical supplies to the ISS. These supplies would be used to continue the outfitting of the Unity and Zarya modules and for later use to set up the Russian Service Module for occupancy by a three-man crew. In addition, a small educational satellite called STARSHINE was deployed for observation by international students. KSC W/D: OPF 122, VAB 12 (2), PAD 30 (2) = 164 days total (Rollback to repair ET foam) LAUNCH POSTPONEMENTS: - Baselined launch date of 12/9/98 on 10/2/97 Postponed launch date to 5/13/99 on 6/4/98 (Multi-flight changes to ISS flights), then to 5/20/99, to 5/24/99, and to 5/20/99 on 4/21/99 Postponed launch date to NET 5/27/99 based on 5/13/99 decision to roll back to VAB on 5/16/99 to repair hail damage to ET foam (648 divots, 459 required repair) Rolled back to pad on 5/21/99 and confirmed 5/27/99 as the launch date. LAUNCH SCRUBS: None LAUNCH WINDOW: - The launch window was in two panes. Pane 1 opened at 147:10:48:46Z and closed at 147:10:54:42Z. There was a 10-second cutout with pane 2 opening at 147:10:54:52Z and closing at 147:10:57:48Z. The total launch window was 9MZS with a 10-second cutout between panes based on the ISS Planar/Phase window. The decision was made to use the Preferred Launch Time (PLT) of 147:10:49:42Z for a launch window of 8 minutes 6 seconds, in two panes with a 10-second gap. LAUNCH DELAYS: None - Launch occurred on time at 147:10:49:42Z, 6:49:42 AM EDT on Friday, May 27, 1999. TAL WX: - ZARAGOZA (Prime) was forecast NO GO - tailwind (at landing time observed NO GO, tailwind and thunderstorms). Moron (Selected) and Ben Guerir were both forecast GO and observed GO at landing time. PERFORMANCE ENHANCEMENTS: - Standard set loss of the pair were both forecast GO and observed GO at landing time. |

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM- ABORT EMERG | SRB RSRM | 0 | RBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|--------|---------|-------------------------|-------------------------------|--|-----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-96 | | | Continued | Continued | | | | | | Continued | Continued |



ISS-2A.1

Continued

STS096-E-5168--linflight crew portrait: At bottom center: CDR Rominger, flanked by Barry/MS & Ochoa/MS. Above Barry (left) Tokaerev/MS(RSA), Jernigan/MS & Payette/MS (CSA), PLT Husband is between Payette & Ochoa.



STS096-357-003 (30 May 1999) --- MS1 Jernigan totes part of a Russian-built crane, Strela (a Russian word meaning "arrow").

SIGNIFICANT ANOMALIES

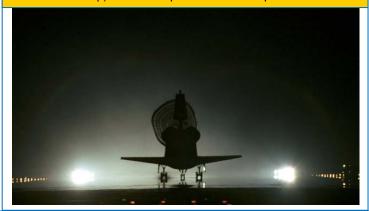
DENS ALT: 1321 FT

- Humidity separator B water carryover.
- Vestibule leakage during airlock depress.
- SSOR anomalies: choppy EVA comm, EVA comm squeal, SSOR noise malfunctions during EVA, EMU TLM from SSOR static.
- Difficulty attaching SCU 1 to DCM.
- Lost LG/SM retractable tether came off fish stringer.
- Small equipment hook failed open tether release from D-ring on miniworkstation.
- SAFER Pyro Valve Fired/Manual Isolation Valve
- F4R Thruster declared failed leak by RM.



STS096-E-5219 --- ISS as seen from Discovery after separation.

STS096-(S)-010 --- First flight of Functional Drag Chute with strengthened door pins after STS-95 problem (door fell off at SSME throttle-up). Inconel replaced aluminum pins.



RMS USED FOR EVA SUPPORT AND SURVEY SVS (SPACE VISION SYSTEM)

FLIGHT DURATION CHANGES: None Landed on orbit 154 as planned.

FIRSTS/LASTS/RECORDS:

- First flight of Functional Drag Chute with strengthened door pins after problem on STS-95 (Inconel was aluminum).
- First logistics/maintenance flight to ISS, Third ISS flight, 2nd Docking Flight to ISS (PMA2) Node 1 forward

SHUTTLE NIGHT LANDING # 11: KSC runway 15

- OMS assist burn 147:10:51:57Z with a duration of 2M42S.
- RCS MC4 at 149:02:55:17/01:16:05:35 MET.
- ISS ring capture 149:04:23:51Z, docking
- 149:04:37:38Z/01:17:47:56 MET at PMA2. Node 1 Forward
- STARSHINE deployed at 156:07:21Z/08:20:32 MET.
- Crew ingressed ISS PMA2 at 149:07:00Z/01:20:10 MET. IFM: Replaced FGB Battery MIRT's, and Replaced
- ECOMM Transceiver and Power Distribution Box.
- EVA Start Time 150:16:21:36Z/03:05:31:54 MET. EVA End Time 151:00:16:36Z/03:13:26:54 MET. EVA tasks include Installation of FGB target mask, installed Orbital Transfer Device and IAPFR on PAM 1, installed Strela crane on PMA2, installed trunnion pin cover, and transferred EVA tools to Node 1.
- Reboost Start 154:09:36:54Z/06:22:47:11 MET. Reboost End 154:10:11:40Z, Delta V 21.8 fps, altitude increased 6 nm, orbit 212.1 by 206.2 nm.
- Undocking complete 154:22:39:17Z/07:11:36 MET.
- ISS Visitor time is 5:18:01:39.
- Final transfers to ISS: EVA 661 lbs. IVA transfers 2881 lbs, and water transfers 686 lbs (7 CWC's), Total to ISS 4228 lbs. To Shuttle 197 lbs.
- Return IVA transfers to Discovery 213 lbs.
- Landed on orbit 154, Ascending Left 23,
- Crossrange 712 NM, range 4370 NM, Runway 15.

RENDEZVOUS # 45:

Rendezvous and dock with ISS.

RADIATOR DEPLOY # 24:

| | | CREW | LAUNCH SITE, | LANDING SITE/ RUNWAY, | SSME-TL NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
|-----------------|-------------------------|---|----------------------------------|-----------------------------------|--------------------------------|--|---------------|---|--------|-------------------------------------|---|
| FLT | ORBITER | (5) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, WINDS | PROFILE ENG. S.N. | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-93 | | CDR: | KSC PAD 39B 204:04:31:00Z | KSC 33 (KSC 48) 209:03:20:35Z | 104/104/ | BI-097 | 28.45° | DIRECT | OI-26B | CARGO: | Brief Mission Summary: The primary objective of the STS-93 |
| 050 | (Flight 26) Columbia | Eileen M. Collins (Flt 3 - STS-63, STS-84) | 12:24:00 AM EDT (P) | 11:03:20:35 PM EDT | 109% | RSRM | (48) | INSERTION | (5) | 52382 LBS | mission was to deploy the \$1.5 billion Chandra, the world's most powerful X-Ray Observatory, and third in NASA's series |
| SEQ FLT # 95 | Culumbia | P559/R188/V139/F24 | 12:31:00 AM EDT (A) Friday 19 | Wednesday 10 | PREDICTED: | 69 | | POST OMS-2: | | PAYLOAD | of "Great Observatories. Other objectives included |
| 121 11 70 | | | 7/23/99 (6) | 7/28/99 (9) | 100/104/104/ 67/104 | ET-99 | | 154 X 145 NM | | CHARGEABLE: 49798 LBS | execution of jet firings for Air Force satellite plume study and |
| KSC- 95 | OMS PODS: LPO5-15 | <u>PLT</u> : Jeffrey S. Ashby | LAUNCH WINDOW: | | ACTUAL: | | | | | | operation of the Southwest Ultraviolet Imaging System. This was also the first Shuttle mission commanded by a female, |
| PAD 39B-41 | RPO5-14 | P560/R251/M218 | 46 Minutes | DEORBIT BURN: | 100/104/104/ | SLWT-5 | | | | DEPLOYED: 43080 LBS | CDR Eileen M. Collins. |
| | FRC2-26 | M/C 1. | EOM PLS: KSC | 209:02:19:00Z | 67/104 | STSOC | 2 702 0 | 148 Chandra | . V | NON-DEPLOYED: | KSC W/D: OPF 223, VAB 5, PAD 43 = 271 days total. |
| MP-1L | | M/S 1: Cady G. Coleman | TAL: BYD TAL WX: BEN | XRANGE: 83 NM | 1 = 2012 (22) 2 = 2031 (17) | | | ry, back-dropp | | 5171 LBS | LAUNCH POSTPONEMENTS: |
| | | (Flt 2 - STS-73) | | <u>ORBIT DIR</u> : DL 45 | 3 = 2019 (19) | agains | t a dese | rt in Namibia, | just | MIDDECK: | - Baselined 8/27/98 as launch date on 5/16/97. |
| | | P561/R201/V156/F27 | SELECTED: RTLS: KSC 15/N/N | AIM PT: NOMINAL | | before payloa | | from Columbia | as | MIDDECK: 1538 LBS | - Postponed launch date to 12/3/98 and to 1/21/99 (Multi-flight change to ISS flights). |
| | | <u>M/S 2</u> : | <u>TAL:</u> BEN 36/N/N | | | F 1.7.00 | | () () () () () () () () () () | 75- | <u>SHUTTLE</u> | - Postponed to 3/18/99, to 3/25/99, to 4/8/99, to 4/15/99, to |
| | | Steven A. Hawley | PLS: EDW 22/N/N | MLGTD: 2533 FT 209:03:20:35Z | | | THE REPORT OF | 1 | (C) | ACCUMULATED WEIGHTS: | 7/9/99, to 7/22/99, and to 7/20/99 (primarily Chandra AXAF/IUS delays). |
| | | (Flt 5 - STS 41-D, STS 61-C,STS-31 & STS- | TDFL: | VEL: 201 KGS 196 KEAS | | | | A COMPANY | | DEPLOYED: | |
| | | 82) | <u>TDEL</u> : 0.05 0.092/0.13 | HDOT: -1.0 FPS | | | | | - 4 | 925154 LBS NON-DEPLOYED: | LAUNCH SCRUBS: |
| | | P562/R39/V29/M38 | MAX Q NAV: | TD NORM 195: | | | | | | 1404092 LBS CARGO TOTAL: | - 7/20/99 (12:36 AM EDT.) Launch attempt was halted with a manual GLS cutoff at T-7 seconds (approximately 200 |
| | | M/S 3: | 673 675 | 2628 FT | | | | | | 2910842 LBS | milliseconds prior to Main Engine Start) due to a (false) spike |
| | | Michel Tognini | SRB STG: 2:03.5 2:04 | DRAG CHUTE | | | | | | PERFORMANCE | indication of 640 ppm H2 concentration in the aft. Insufficient |
| | | (CNES-France) P563/R252/M219 | 2:03.5 2:04 | DEPLOY: 190 KEAS 209:03:20:37Z | | | | 3 | | MARGINS (LBS): | time to wait for the confirmation sample at T-8 seconds and allow time to issue a manual GLS cutoff before Main Engine |
| | | 1 000/11202/11/217 | PERF: NOMINAL | | | | | 3 | | FPR: 3553 FUEL BIAS: 720 | Start at T-6.33 seconds. The manual cutoff call was made at T- |
| | | MCC WILLTE ECD (SE) | 2 ENG TAL (BEN): | NLGTD: 5470 FT 209:03:20:44Z | | | | | | FINAL TDDP: 2081 RECON: -3981 | 10 seconds. A 48-hour scrub turnaround was required to replace the Hydrogen Long-Throw Igniters. KSC, BYD, and |
| ILIS | ASHB | MCC WHITE FCR (25) | 3:20 3:18 | VEL: 159 KGS 149 KEAS | | | | | | | BEN were forecast and observed GO. Launch reset for |
| COLLIN | | FLIGHT DIRECTORS: | NEG RETURN: | HDOT: -4.1 FPS | | | A. Carrier | The same | | <u>PAYLOADS</u> : PLB: | 7/22/99. Technical Scrub. |
| | | A/E/O1 - J. P. Shannon LD/O 2 - B. P. Austin & | 3:52 3:59 | BRK INIT: 122 KGS | N. S. | The Party of the P | | | | AXAF-I/IUS | - 7/22/99 (12:28 AM EDT.) Launch attempt was scrubbed at T+47:30 due to Range and RTLS weather. During count, rain |
| | OF ! | P. F. Dye | PTA (U/S 219): 5:25 5:19 | DRAG CHUTE | | IX | 1 | 11 | 3 | (CHANDRA deployed) | and lightning hits within 20 NM, and thunderstorms within 20 |
| 8 | | PLNG - C. W. Shaw MOD - B. R. Stone & | | <u>JETTISON</u> : | | FT | 41 | | | | NM. Counted down to T-5 minutes and held awaiting improved weather. Mission Director gave ok to extend window 36 |
| EMAN! | WAWLEY TOO | J. W. Bantle | <u>DROOP</u> : 5:26 5:25 | 43 KGS 209:03:21:05Z | <u>M 3 EOM</u> : | <u>ET</u> <u>RPT</u> : 283K | | | | MIDDECK: | minutes by giving up first day deploy. Scrubbed launch at |
| | - 11 | | SE TAL (BYD): | BRK DECEL FPS2: | WEIGHT: 202872 LBS | | | | | MSX, SIMPLEX, SWUIS, GOSMAR, | 203:05:17:35Z (T+47:30) with no signs of improvement in |
| | The Laboratory | 01101 | 6:02 5:59 | AVE 9.1 PK 10.4 | | <u>ET</u> BR/UP: | | | | STL-B, LFSAH, CCM, SAREX-II, | weather (lightning within 8.6 miles of SLF and thundershowers within 20 NM). Banjul was NO GO for ceiling/rain. Ben Guerir |
| | | | PTM (U/S 219): | WHEELS STOP: | X CG: 1097.54 | K | | DEORBIT: | | EARTHKAM, PGIM, CGBA, MEMS, BRIC | was GO. Launch reset for 7/23/99. Weather Scrub. |
| The same of | 2 | | | 209:03:21:19Z | . 377.07 | ET | | 151 x 139 NM | | CGBA, MEMS, BRIC | LALINCH WINDOW. |
| | | | MECO CMD: | 9384 FT | LANDING: | <u>IMPACT</u> | | ENTRY VELOCITY: | | 3 CRYO TK SETS | LAUNCH WINDOW: 46 minutes planned window. During count, the customer relaxed |
| 1 1 | 6 | | 8:28 8:28 | ROLLOUT: 6851 FT | WEIGHT: | MET: | | <u>VELOCITY</u> : 25762 FPS | | (Off Load) | contingency deploy opportunities and IUS battery eclipse |
| | 1 | | <u>VI</u> : 25876 25859 | 44 SEC | 202796 LBS | 1:23:16 LAT: | | <u>ENTRY</u> | | 4 GN2 TANKS | constraints to extend window to 116 minutes; however, launch window was limited to Range availability (60 minutes). |
| | | | 25 876 25859 | | X CG: | 17.54°N | | RANGE: | | | g , , |
| Fileen M | Collins first f | emale Shuttle CDR | Continued | Continued | 1099.36 | <u>LONG</u> : 154.66°W | | 4332 NM | | NO RMS | Continued |
| LIICCII IVI. | Comino, mot r | omalo onatilo obit | | | | | | | | | |
| | | | | | | | | | | | |

| FLT | ORBITER | CREW (5) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|--------|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-93 | | | Continued | Continued | | | | | | | Continued |



STS093-706-039 --- Chandra X-Ray Observatory after release from Columbia's payload bay.

OMS-2: 41:04 WINDS: 41:06.9 04T, 5L KTS 200 FPS 2:14 OFFICIAL: 2405P06 200 FPS 2:14 SS: OT, 5L

> DENS ALT: 1551 FT

PK: OT. 6L

FLT DURATION: 4:22:49:35

S/T: 816:16:28:48

<u>OV-102</u>: 273:21:09:17

DISTANCE: 1,796,000 sm



STS093-322-017 --- Collins, first female Shuttle CDR, and crew are shown on-orbit. In front are CDR Collins and Tognini/MS (France). In rear are (from the left) Hawley/MS, Ashby/PLT, and Coleman/MS.

LAUNCH DELAY:

- Launch was delayed 7M0S during T-20 minute hold for MILA to change out A Frame Sync Box to restore the forward link.
- Launched at 204:04:31:00Z, 12:31:00 AM EDT on July 23,

SHUTTLE NIGHT LAUNCH #21

TAL WX:

- Baniul (prime) was forecast NO GO (thunderstorms and anvil clouds) and observed NO GO (thunderstorms and ceiling). Ben Guerir (selected) was forecast and observed GO.

PERFORMANCE ENHANCEMENTS:

- Standard set.
- PE LO Q SUM/JUL

SHUTTLE NIGHT LANDING # 12: KSC 33 on Wednesday, 7/28/99 at 11:20:35 PM EDT - moonlit landing.

FLIGHT DURATION CHANGES: None

- Landed on orbit 80 as planned.

FIRSTS/LASTS:

- First space flight with female Commander (Eileen Collins).
- First U.S. flight for Michel Tognini (CNES-France). Michel's first space flight was to Mir on Soyuz TM-15S.
- Last flight of phase 2 engines.
- Most aft landing Xcg (1099.36)





ABOVE: Hawley/MS shown with Micro-Electromechanical Systems (MEMS) experiment. MEMS monitors a suite of sensors under flight conditions. ABOVE RIGHT: Mark Sowa (PAO photographer) recorded the fly-over of Space Shuttle Columbia above the JSC Rocket Park. The Saturn V is below the streak left by the shuttle Columbia re-entering the atmosphere.

SIGNIFICANT ANOMALIES:

- At approximately Liftoff plus 5 seconds, there was a short circuit on AC1 Phase A for approximately 0.5 seconds. The resultant under voltage caused SSME 1 "A" and SSME 3 "B" controllers to be disqualified. Postflight, it was determined the short was on AC1 Phase A to SSME 1 "A" controller.
- At liftoff, the right SRB hydraulic pressure sensor 2 was
- Four ET LO₂ sensors indicated dry resulting in low-level cutoff of main engines and slightly early MECO.
- Right SSME multiple performance parameters deviations (Post-flight inspection revealed ruptures in three Engine 2019 nozzle tubes caused by an impact of a loose LO₂ post deactivation pin. LH2 leak resulted in controller compensating for fuel loss with additional LOX flow, a 16 fps underspeed, and 8 nm lower altitude).
- CRT 3 Critical BITE.
- High-load FES excessive water carryover.
- Camcorder tape iam.
- Primary thruster F2D low fuel injector temperature.

| | | | | LANDING SITE/ | SSME-TL | | | | | | |
|--|-------------|--|-------------------------------------|---------------------------------|------------------------------|-------------------|----------|---|-----|-----------------------------|---|
| | | CREW | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (7) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | ORBIT | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | ONDITER | TITLE NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | TITLE, NAMES | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | & EVA'S | | WINDS | ENG. S.N. | | | | | | · |
| STS-103 | OV-103 | CDR: | KSC, PAD 39B | KSC 33 (KSC 49) | 104/104/ | BI-099 | 28.45° | DIRECT | | CARGO: | Brief Mission Summary: The STS-103 mission was the |
| 0.0.00 | (Flight 27) | Curtis L. Brown | 354:00:50:00Z | 362:00:00:47Z | 109% | RSRM | (49) | INSERTION | (6) | 20276 LBS | third Servicing Mission to ensure the health of the |
| SEQ FLT | Discovery | (Flt 6 - STS-47, | 7:50:00 PM EST (P) | 7:00:47 PM EST | | 73 | | DOOT 0110 0 | | 5.0.0.0.0 | Hubble Space Telescope (HST), the first of NASA's |
| #96 | | STS-66, STS-77, | 7:50:00 PM EST (A) | Manuelani 17 | PREDICTED: | FT 101 | | POST OMS-2: 315.4 X 170.2 | | PAYLOAD CHARCARIE | "Great Observatories". Included were four spacewalks |
| | | STS-85, & STS-95) P564/R152/V112/M136 | Sunday 11 12/19/99 (6) | Monday 17 12/27/99 (11) | 100/104.5/ 104.5/67/ | ET-101 SLWT-6 | | 315.4 X 170.2 NM | | CHARGABLE: 13208 LBS | designed to install new equipment and replace old. |
| KSC-96 | OMS PODS: | P304/R132/V112/IVI130 | 12/19/99 (0) | 12/2/199 (11) | 104.5/67/ | SLW1-0 | | INIVI | | 13200 LD3 | The primary objective was to replace the six |
| DAD | LPO1-30 | PLT: | LAUNCH WINDOW: | DEORBIT BURN: | 104.5 | FT | | | | DEPLOYED: | gyroscopes to restore the three Rate Sensor Units to |
| <u>PAD</u> 39B-42 | RPO3-28 | Scott J. Kelly | 42M16S | 361:22:48:26Z | ACTUAL: | <u>ET</u> RPT: | | | | 5423 LBS | full power. Other replacements included: an upgraded |
| MLP-2 | FRC3-27 | P565/R253/M220 | HST Planar/Phase | VDANOE 455 NM | 100/104.5/ | 283K | | | | | computer, a set of Fine Guidance Sensors, and a new |
| IVILI -Z | | | Window | XRANGE: 155 NM | 104.5/67/ | | OT040 | 0.740.040.74 | 0 | NON-DEPLOYED: | Solid State Recorder. Deteriorated insulation on the |
| HST FLT | | <u>M/S 1/EV 1</u> : | EOM PLS: KSC | ORBIT DIR: DL 46 | 104.5 | ET IMPACT: | | 3-713-048 (1 | | 6451 LBS | HST's outer surface was also repaired. |
| #4 | | Steven L. Smith | TAL: BYD | | 4 0050 (4) | IMPACT: | | ember 1999 |) | MDDEOK | KSC W/D: OPF 141, VAB 9, PAD 36 = 186 days |
| (SM-3A) | | (Flt 3 - STS-68, STS-82) P566/R184/V137M161 | TAL WX: BEN | <u>aim Pt</u> : Nominal | 1 = 2053 (1) 2 = 2043 (3) | 1:19:15 | | and Grunsfe | eld | MIDDECK: 1334 LBS | NSC W/D. OPF 141, VAD 9, PAD 30 = 100 days |
| | | P300/R184/V13/W101 | | MLCTD, 2004 FT | 2 = 2043 (3) 3 = 2049 (2) | MET LAT: | replacir | ng gyroscope | es, | 1334 LBS | LAUNCH POSTPONEMENTS: |
| HST | | M/S 2: | SELECTED: | MLGTD: 2804 FT 362:00:00:47Z | J - 2047 (Z) | 17.4°N | contain | ed in rate | | SHUTTLE | - Baselined 10/14/99 as launch date on 3/18/99. |
| SERVICE | | Jean-Francois Clervoy | RTLS: KSC 15/N/N TAL: BEN 36/N/N | VEL: 187 KGS | ALL IIA | LONG: | sensor | units (RSU) | | ACCUMULATED | - Postponed launch to 11/19/99 on 9/16/99. OV-103 |
| <u>FLT #3</u> | | (ESA-France) | AOA: EDW 04/N/N | 186 KEAS | ENGINES | 141.4°W | inside l | | | WEIGHTS | wire inspections and repair. |
| | | (Flt 3 - STS-66, STS-84) | PLS: EDW 22/N/N | HDOT: -2.9 FPS | | | | | | DEPLOYED: | - Postponed launch to 12/2/99 on 10/22/99. OV-103 |
| | | P567/R186/V140/F163 | <u> </u> | | 4.1 | NA NE | | 1 3 1 | | 930577 LBS | wire inspections and repair. |
| | | NAIC OFFICE | TDEL: | TD NORM 195: | | | | 1000 | 100 | NON-DEPLOYED: | - Postponed launch to 12/6/99 on 11/10/99. OV-103 wire inspections and repair. |
| | | M/S 3/EV 2: John M. Grunsfeld | 0.08 -0.158/-0.12 | 2237 FT | 1 1 | | | 2010 | A | 1411877 LBS CARGO TOTAL: | - Postponed launch to 12/11/99 on 12/7/99. |
| | | (Flt 3 - STS-67, STS-81) | MAX Q NAV: | DRAG CHUTE | | E. | | | 1 | 2931118 LBS | Replacement of damaged SSME wiring harness. |
| | | P568/R191/V133/M167 | 718 720 | DEPLOY: 176 KEAS | | | | 17 | 2 | 2731110 LD3 | - Postponed launch to 12/16/99 on 12/9/99. Changeout |
| | | . Gogitti y ii v i goniii roy | 710 720 | 362:00:00:50Z | | | | | 260 | PERFORMANCE | of dented LH2 4-in Recirc manifold. |
| | | M/S 4/EV 3: | SRB STG: | NII OTD. FOLL ET | | | | 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 100 | MARGINS (LBS): | |
| | | Michael Foale | 2:05.3 2:05 | NLGTD: 5955 FT 362:00:00:58Z | | | | 1 (8%) | | FPR: 3783 | LAUNCH SCRUBS: |
| | | (Flt 5 - STS-45, STS-56, | PERF: NOMINAL | VEL: 141 KGS | A | | | 11118111 | 25 | FUEL BIAS: 720 | - Scrubbed 12/16/99 launch attempt at 9:18 AM EST at |
| | | STS-63, Up STS-84,& Dn | I LIXI . NOMINAL | 138 KEAS | | | Sale. | 4 220 | | | ET Tanking MMT while holding at T-6 hours. ET weld wire issue caught by vendor X-ray inspection. ET |
| | | STS-86) P569/R143/V92/M127 | 2 ENG TAL (BEN): | HDOT: -4.6 FPS | | | \$2M | 100 | 100 | RECON: 13308 | cleared ET hardware. Orbiter needed 24 hours to |
| | | F 309/K 143/ V 92/W1127 | 2:05 2:05 | | 4 | | | | | PAYLOADS | review orbiter weld processes and personnel records to |
| | | M/S 5/EV 4: | NEC DETUDN | BRK INIT: 111 KGS | | | | - July 1 was | | PLB: | evaluate possible impact to orbiter hardware. Review |
| J BR | OWN KELL | Claude Nicollier | NEG RETURN: 3:54 | DRAG CHUTE | | | | | | HST SM-3A | found no issue to orbiter fleet. Reset launch to |
| QNO A | | ESA-Switzerland) | 3.31 3.34 | JETTISON: 54 KGS | | | | 1 | 200 | (3rd HST Service | 12/17/99. Technical Scrub. |
| 3 | | (Flt 4 - STS-46, STS-61, & | PTA (U/S 500): | 362:00:01:18Z | - 40 | A COLUMN | | DATE OF THE PARTY | | Flight) | - Scrubbed 12/17/99 launch attempt at 8:47 PM EST at |
| 9 | | STS-75) | 3:09 3:08 | | 100 | 1 | | | | 5 0) (DO TIV OFTO | 4 minutes into window due to KSC range and RTLS |
| Ĩ, | | P570/R150/V98/M134 | DTM (LUC FOO) | BRK DECEL FPS ² : | MAFOM | | | | | 5 CYRO TK SETS | weather. Weather concerns were low ceiling (broken 6500 feet), rain, turbulence, thick cloud layer (triggered |
| THE STATE OF THE S | | | PTM (U/S 500): 4:16 4:15 | AVE 6.5 PK 10.0 | <u>M 3 EOM</u> : | | | | | 6 GN2 TANKS | lightning), and RTLS crosswinds at limit. Had difficulty |
| Sa. V | A. A. | SS EVA #46 | | WHEELS STOP: | WEIGHT: | | | | | RMS 54 | getting Jimsphere balloons to altitude due to icing |
| WITH F | DALE NICOLD | EMU/TETHERED | SE TAL (BYD): | 362-00-01-357 | 212288 LBS | | | DEORBIT: | | (S.N. 301) | conditions. Use of 450 MHz radar profiler as backup |
| | ONLO | EMU/TETHERED EVA #39 ON 12/22/99 SCHEDULED EVA #40 | 5:37 5:43 | 9809 FT | 2.2200 250 | | | 330 X 301 NM | | (6 | confirmation of wind persistence was being worked. |
| | | DURATION 8:15:30 | MECO CMD: | 48 SECS | X CG: | | | | | RMS USED FOR | EDW runway distance lighting markers power failure. |
| | | SS EVA #47 | | ROLLOUT: | 1080.64 | | | <u>ENTRY</u> | | HST GRAPPLE, | FD switched to NOR for AOA and first day PLS. |
| | | IEMU/TETHERED | 0.20.7 | 7005 FT | LANDING | | | VELOCITY: | | BERTH, AND | Launch was scrubbed when it became evident bad |
| | | EVA #40 ON 12/23/99 SCHEDULED EVA #41 | <u>VI</u> : 26128 26124 | | <u>LANDING</u> : | | | 26114 FPS | | RELEASE AND EVA SUPPORT | weather conditions would continue throughout the remainder of the window. Ben Guerir and Banjul TAL |
| | | DURATION 8:10 | 26128 26124 | | WEIGHT: | | | <u>ENTRY</u> | | SUPPURI | sites were GO. Ben Guerir was selected. Reset launch |
| | | | | Continued | 212217 LBS | | | RANGE: | | | to 12/18/99. Window was 42M11S first pane, 10 |
| | | Continued | Continued | Sommucu | 212217 LDJ | | | 4237 NM | | | second cutout, and then 4M11S in second pane. |
| | | | | | X CG: | | | .==: | | | Weather Scrub. |
| | | | | | 1082.39 | | | | | | Continued |
| | | | | | 1 | | | 1 | | | Continued |
| | | | | | | | | | | | |

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | 0 | RBIT | FS W | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----------|---------|--|-------------------------------|---|----------------------------------|-------------|-----|-------|---------|--------------------------|---|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-103 | | Continued | Continued | Continued | | | | | eg- | | Continued <u>LAUNCH SCRUBS</u> : |
| Continued | | SS EVA #48 EMU/TETHERED EVA #41 ON 12/24/99 SCHEDULED EVA #42 | | WINDS: B 1T, 7L KTS | | | | | | ~ | - Scrubbed 12/18/99 launch attempt at 8:21 AM EST at ET Tanking MMT while holding at T-6 hours due to observed and forecast bad Range and RTLS weather: |



DURATION 8:09

MCC WHITE FCR (26)

FLIGHT DIRECTORS:

A/E/O 4 - N. W.Hale

LD/O 1 - L. J. Ham

O 2 - B. P. Austin

2:34

252 FPS

DISTANCE:

2:34 2406P12

DENS ALT: -107 FT

FLT DURATION:

S/T: 824:15:39:35

<u>OV-103</u>: 204:07:55:46

DISTANCE: 3,267,360 sm

7:23:10:47

247 FPS OFFICIAL:

STS103-726-081 (19-27 December 1999) ---Repaired HST after release from RMS.



S99-15923 -- View of JSC MCC during Flight Day 3 activity. Lead Orbit 1 FD Linda Ham is at rear right.



STS103-397-035 -- Crew portrait. Front: (It to rt) Nicollier/MS(ESA), PLT Kelly, & Grunsfeld/MS. Back row: (It to rt) Smith/MS, Foale/MS, CDR Brown, & Clervov/MS(ESA).



STS103-731-051 (19-21 December 1999) --- Foale (left) and Nicollier/ESA (on end of RMS) replacing one of HST's Fine Guidance Sensors (FGS).

SIGNIFICANT ANOMALIES:

- Jammed PFR roll joint.
- Loss of power indication on middeck EMU battery charger.
- HST PFR pitch joint would not lock.
- Release hatch Pip Pin on Starboard Airlock hinge.
- EMU 2 Power up failure.
- Bent pin on EMU3 DCM.

ET Tanking MMT while holding at T-6 hours due to observed and forecast bad Range and RTLS weather: Rain, low ceiling, and thick clouds triggered lightning conditions. Decision to evaluate 8 + 2, 3 EVA flight, evaluate landing as late as 12/29/99, and vehicle configuration for holiday standdown. At MMT Meeting at 8:30 AM EST on 12/19/99, decision was made to recommend GO for launch on 12/19/99 at 7:50 PM EST. Weather forecast was good and ET MMT gave a GO to tank. Range and RTLS Weather Scrub.

<u>LAUNCH WINDOW:</u> Launch window 42M16S in one pane.

LAUNCH DELAYS: None

Launched at 354:00:50:00Z (GMT date 12/20/99), 7:50:00 PM EST, on Friday, 12/19/99.

Banjul (prime) was forecast and observed NO GO with visibility 3 miles (smoke/haze). Ben Guerir (selected) was forecast and observed GO.

PERFORMANCE ENHANCEMENTS: - Standard set. PE LO Q WIN/DEC

SHUTTLE NIGHT LAUNCH #22

FLIGHT DURATION CHANGES:

Planned landing at KSC on orbit 119. Extended flight one orbit for weather. Waved off landing at KSC on orbit 119 due to crosswinds of 18 knots, peak 19 knots and STA reported turbulence at 500 feet. Landed on KSC 33 on orbit 120.

SHUTTLE NIGHT LANDING #13

- Landed on KSC 33 on orbit 120 at 362:00:00:47Z, 7:00:47 PM EST on Monday, December 27, 1999.

EVENTS:

- HST grapple at 356:00:34:01Z; HST berth 356:01:42:00Z.
- EVA-1 Start at 356:18:41:01Z; MET 02:18:04:40 to 03:02:19 MET: duration 8:15:30.
- EVA 2 Start MET 03:18:16 to 04:02:26; duration
- EVA 3 MET 04:13:27 to 05:02:36; duration 8:09.
- HST unberth at 359:21:18:41Z; HST release 359:23:03:01Z.

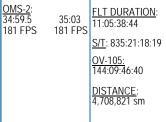
RENDEZVOUS # 46:

Rendezvous, capture, service, and release HST.

| | | CDEW | | LANDING SITE/ | SSME-TL | | | | | | |
|----------------------|--|--|--|---------------------------------------|------------------------------|-------------------------|------|-----------------------------------|-------|--------------------------------------|---|
| | | CREW (6) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (0) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, WINDS | PROFILE ENG. S.N. | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-99 | OV-105 | CDR: | KSC 39A | KSC 33 (KSC 50) | 104/104/ | BI-100 | 57.0 | DIRECT | OI-27 | CARGO: | Brief Mission Summary: STS-99 was the first shuttle flight of |
| 0.0 // | (Fliaht 14) | Kevin R. Kregel | 42:17:43:40Z | 53:23:22:24Z | 109% | 50511 | (20) | INSERTION | (2) | 35410 LBS | the new century. The primary payload was a space radar, |
| SEQ FLT #97 | Endeavour | (Flt 4 - STS-70, STS-78, & STS-87) | 12:30:00 PM EST (P) 12:43:40 PM EST (A) | 6:22:24: PM EST | PREDICTED: | RSRM 71 | | POST OMS-2 | | PAYLOAD | known as Shuttle Radar Topography Mission (SRTM). The |
| KSC-97 | | P571/R197/V129/M172 | Friday 20 | Tuesday 15 | 100/104.5/ | | | POST OMS-2: 129.5 X 126.1 | | CHARGEABLE: | SRTM successfully mapped the Earth in 3-D, 30 times more |
| | OMS PODS: LPO4-21 | PLT: | 2/11/2000 (7) | 2/22/2000 (5) | 104.5/72/ 104.5 | ET-92 | | NM | | 29069 LBS | accurately than current global maps. The system used two radar antennas mounted in the shuttle payload bay and two |
| <u>PAD</u> 39A-55 | RPO1-28 | Dom L. Gorie | LAUNCH WINDOW: | DEORBIT BURN: | 104.5 | LWT | | RCS OA | | DEPLOYED: | on a 200-foot-long mast extended out of the payload bay. |
| MLP-3 | FRC5-14 | (Flt 2 - STS-91) | 2H10M Closed | 53:22:25:10Z | ACTUAL: | 85 | | MANEUVER | | 260 LBS | This mast was the longest rigid structure deployed in space |
| | | P572/R242/V157/M211 | on SRTM BETA ANGLE | XRANGE: 242 NM | 100/104.5/ 104.5/72/ | | | 4:14:00 MET: | | NON-DEBLOYED: | at this time. The SRTM is an outgrowth of the Spaceborne |
| | | <u>M/S 1</u> : | CONSTRAINT | ORBIT DIR: DL 47 | 104.5 | | | 126.5 X 128.7 | | NON-DEPLOYED: 26987 LBS | Imaging Radar flown on STS-59 and STS-68. |
| | | Gerhard P. J. Thiele ESA Germany | EOM PLS: KSC | AIM PT: NOMINAL | 1 = 2052 (1) | | | NM | | MIDDECK: | KSC W/D: OPF 257, VAB 10, PAD 44 = 311 days total. |
| | | P573/R254/M221 | TAL: ZZA | | 2 = 2044 (3) 3 = 2047 (3) | JSC200 | 00E0 | 1556 (Janua | ary | MIDDECK: 1822 LBS | |
| | | MIC 0 | TAL WX: MRN,BEN | MLGTD: 2885 FT 53:23:22:24:Z | 3 = 2047 (3) | 2000) - | Arl | ist's concep | ot . | | LAUNCH POSTPONEMENTS: - Baselined launch date of 6/30/99 on 3/5/98 (OV-104); then to |
| | | M/S 2: Janet L. Kavandi | SELECTED: | IVEL:206 KGS | ALL BLOCK IIA SSME'S | | | ırth mapping | | SHUTTLE ACCUMULATED | 1/22/99 on 6/4/98 (Multi-flight changes ISS SM delay). |
| | | (Flt 2 - STS-91) | SELECTED: RTLS: KSC 33/CI/N | 207 KEAS HDOT: -1.6 FPS | | operation | | | | WEIGHTS: | - Advanced launch date to 9/16/99 on 7/23/98. OV-104, OV-103 |
| | | P574/R243/V158/F32 | TAL: ZZA 30/N/N AOA: NOR 23/CI/N | TD NORM 205: | | | | | | DEPLOYED: 930837 LBS | on 7/30/98 to achieve additional GPS DTO Flight. Updates to flight dates and baseline STS-101 OV-105 on 10/5/98. |
| | | M/S 3: | PLS: EDW 22/CI/N | 3004 FT | | | | | 1116 | NON-DEPLOYED: | - Postponed launch date to NET 11/19/99 on 9/16/99. |
| | | Janice Voss | | DRAG CHUTE | | 100 | | | | 1440686 LBS | STS-103 also NET 11/19/99 due to wire inspections and repairs. |
| | | (Flt 5 - STS-57, STS-63, STS-83,& STS-94) | TDEL: 0.12 -0.38/-0.04 | DEPLOY: 166 KEAS | | 100 | | | | CARGO TOTAL: 2966528 LBS | - Postponed launch date to 1/13/00; additional wire work and STS-103 to fly first. |
| | | P575/R167/V115/F22 | | 53:23:22:36Z | | | | | | | - Postponed launch date to 1/31/00. STS-103 flight delays and |
| | | M/S 4: | MAX Q NAV: 733 | NLGTD: 6520 FT 53:23:22:34Z | | 4 | | 26 | | PERFORMANCE MARGINS (LBS): | Y2K testing. |
| | | Mamoru Mohri | | VEL:169 KGS 168 KEAS | | | | | 70 | FPR: 3272 | LAUNCH SCRUBS: |
| | | Japan (Flt 2 - STS-47) | <u>SRB STG</u> : 2:05.6 2:06 | 168 KEAS HDOT: -65 FPS | | | | | | FUEL BIAS: 854 FINAL TDDP: 1085 | - Scrubbed 1/31/00 launch attempt at 31:19:08:55Z |
| | | P576/R155/V159/M137 | | | | | | | | RECON: 395 | (T-9M12S) with 40M05S left in 2H02M launch window while |
| | | | <u>PERF</u> : NOMINAL | BRK INIT: 115 KTS | | | | | | DAVILOADO | counting to T-9 minutes. At T-29 minutes, a preflight BITE test to the MEC's was executed. MEC 2 (an EMEC) first response was |
| VREGE | L | | 2 FNG TAL (77A). | DRAG CHUTE JETTISON: 52 KGS | | | | | | PAYLOADS: PLB: | anomalous (bad address, bad parity, bad SEV). Scrub at |
| R 1 | | MCC WHITE FCR (27) | 2 ENG TAL (ZZA): 2:48 2:46 | 53:23:23:05Z | | | | | | | 19:08:55Z (T-9M12S). Decision on a 2/1/00 launch at MMT early |
| Ď. | * * " | FLIGHT DIRECTORS: | NEG RETURN: | AVE BRK DECEL: | | | | | | SRTM/SRL-3 with radar antennas on | Tuesday morning. The Range and RTLS was observed and forecast NO GO for 1/31 launch (low ceiling, rain within 20 NM, |
| 0 | The state of the s | A/F - L P Shannon | 3:52 3:55 | AVE 5.9 PK 7.8 FPS/S | | | 115 | - | | 200 ft boom. | field mills in and out, thick cloud layer, and triggered lightning |
| SO | \$ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\ | LD/O2 - P. F. Dye O-1 - L. E. Cain | PTA (U/S 187): | | | | | CAC. | | | potential). All 3 TAL sites were GO. Technical/ Weather Scrub. |
| 1000 | 45 | O3 - B. P. Austin | 5:26 5:21 | <u>WHEELS STOP</u> : 53:23:22:23:Z | | | | / IN I | | | New launch date 2/1/00 at 12:44 PM EST. |
| 108 | GORIE | MOD - J. M. Heflin | DD00D(77A). | 12828 FT | M 3 EOM: | | | | | MIDDEOL | - Scrubbed 2/1/00 launch attempt at approximately 3:00 AM EST with the decision to change out MEC 2. MEC changeout and |
| | | | DROOP(ZZA): 5:16 N/A | ROLLOUT: | WEIGHT: | | | | | MIDDECK: FARTHKAM | retest is 5 to 7 days. Tried to get range for 2/9/00. MCC |
| | | | | 9943 FT | 225092 LBS | <u>ET</u> | | | | LAKTIKAW | changeout/retest and range availability set next launch to |
| | | | PTM (U/S 187): 6:15 6:11 | 59 SEC | X CG: | <u>RPT</u> : 283K | | <u>DEORBIT</u> : 127.9 X 124.4 | | | 2/11/00. Technical scrub. |
| | | | | <u>WINDS</u> : 1R, 7R KTS | 1078.48 | 203N | | 127.9 X 124.4 NM | | | <u>LAUNCH WINDOW</u> : |
| | | | SE TAL (ZZA): 6:03 | · · | | ET | | | | | - The Launch Window was 2H10M00S. Opened at 42:17:30:00Z |
| | | | MECO CMD: | OFFICIAL: 0507P09 | <u>LANDING</u> : | IMPACT 1:12:05 | | ENTRY VELOCITY: | | 5 CRYO TK SETS | and closed at 42:19:40Z. Closed on 0 degrees beta angle constraint for SRTM operations. |
| | | | 8:22.5 8:23.42 | ISS: 2T, 7R | WEIGHT: | MET | | 25714 | | 5 GN2 TANKS | |
| | | | <u>VI</u> : | PK: 3T, 12R | 225030 LBS | <u>LAT</u> : 47.41°S | | ENTRY | | NO RMS | Continued |
| | | | 25776 25769 | DENS ALT: 72 FT | X CG: | LONG: | | RANGE: | | INO INIO | Continueu |
| | | | Continued | Continued | 1080.19 | 162.19°W | | 4624 | | | |
| | | | 25776 25769 | | X CG: 1080.19 | | | | | CIVIN OVI | Continued |
| | | | | 1 | 1 | | | | I | | |

| | FLT | ORBITER | CREW (6) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|---|-------|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| | NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| S | TS-99 | | | Continued | Continued | | | | | | | Continued |

515-99 Continued





STS099-318-015 --- A "star-burst" pose. Top Center: Voss/MS, (clockwise from her) PLT Gorie, Kavandi/MS, Thiele/MS (ESA), Mohri/MS (NASDA), and CDR Kregel.

S99-E-5034 (12 February 2000)--- The 200 ft.-long mast supporting the Shuttle Radar Topography Mission juts into space from Endeavour (out of frame at left).

JSC2000-E-02781 PIA02733 (Release Date: 21 February 2000) --- Perspective view of San Andreas Fault near Palmdale, CA. The view was created by draping a Landsat satellite image (showing residential and agricultural development) over an SRTM elevation model. Topography is exaggerated 1.5 times vertically.





ABOVE: JSC2000-01451 -- SRTM personnel support STS-99 in JSC Payload Operations Control Center (POCC). From left are Mike Kobrick, Ian Joughin and Diane Ainsworth. RIGHT: JSC2000-01454 --- Scott D. Vangen "talks topography" at the Crew Interface Console (CIC) in JSC POCC.

LAUNCH DELAYS:

Launch delay was 13M40S. Held at T-9 minutes hold to clear the IPR's: (1) MPS LH2 manifold P, (2) cabin pressure leak check at lower pressure, and (3) Hyd Sys 1 Circ Pump pressure low. Launched at 42:17:43:40Z, 12:43:40 PM EST, on Friday, February 11, 2000.

TAL WX:

Zaragoza (prime and selected); Moron (2-engine TAL Call), and Ben Guerir were all forecast and observed GO.

PERFORMANCE ENHANCEMENTS:

Standard Set plus: (1) Interim generic High Q WIN/FEB, and (2) OMS Assist is 4000 lbs.

FLIGHT DURATION CHANGES: Extended One Rev due to Crosswind Violations at KSC. Waved off landing on orbit 181.

FIRSTS/LASTS:

- First shuttle flight in the year 2000.

- First flight of Shuttle Radar Topography Mission using dualantenna imaging radar with antennas mounted on 200 foot extended boom.
- Last flight of Lightweight ET.

Landed on KSC runway 33 on orbit 182 at 53:23:22:24Z, 6:22:24 PM EST on Tuesday, 2/22/00.

- SIGNIFICANT ANOMALIES:
 GPC I/O Errors and EMEC preflight BITE error.
- LH₂ Manifold Pressure Tape Meter Oscillations.
- WSB 2 under cool during ascent.

CRT 1 BITE.

- ET GH2 Ullage Pressure Low at MECO.
- Forward Mission Timer Display Elements Failed.
- RRCS Fuel Regulator B Primary Stage Leakage.

 Vernier Thruster L5D Oxidizer Temperature Erratic.
- Supply water dump nozzle blockage.
- APU 1 GG Injector tuber temperature failure.

| | LANDING CITE COME TI | | | | | | | | | | | |
|----------------------|----------------------|--|------------------------------|---------------------------------------|--|-----------------------|--------------|--|---------------------------------------|-------------------------------|--|--|
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | | |
| | | (7) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS | |
| FLT | ORBITER | (7) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, | |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, | |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) | |
| | | | | WINDS | ENG. S.N. | | | | | | | |
| STS-101/ | OV-104 | CDR: | KSC 39A | KSC 15 (KSC 51) | 104/104/ | BI-101 | | DIRECT | OI-27 | CARGO: | Brief Mission Summary: STS-101, 3rd mission to ISS, was | |
| ISS 2A.2a | (Flight 21) | James D. Halsell | 140:10:11:10Z | 150:06:20:19Z | 109% | 50511 | (3) | INSERTION | (3) | 35604 LBS | initially designed to outfit the Russian Zvezda crew quarters. | |
| 100 27 1124 | A 41 41 - | (Flt 5 - STS-65, STS-74, | 6:11:10 AM EDT (P) | 2:20:19 AM EDT | DDEDIGTED | RSRM | | DOCT OMC 2 | | DAVILOAD | However, Zvezda's launch was delayed and the mission was | |
| SEQ FLT #98 | Atlantis | STS-83, STS-94) P577/R178/V123/M156 | 6:11:10 AM EDT (A) | Monday 10 | PREDICTED: 100/104.5/ | 74 | | POST OMS-2: 178.9 X 85.2 | | <u>PAYLOAD</u> CHARGEABLE: | changed to ISS maintenance and logistics support. | |
| | | P377/R176/V123/W1130 | Friday 21 5/19/00 (6) | Monday 18 5/29/00 (9) | 104.5/72 | ET-102 | | NM | | 24733 LBS | Outfitting Zvezda would await STS-106 later in the year. A | |
| KSC-98 | OMS PODS: | PLT: | 3/17/00 (0) | 3127100 (7) | 104.5/72 | SLWT-7 | | INIVI | | 24733 LD3 | high priority of this flight was the replacement of four of six | |
| DAD | LPO3-25 | Scott J. Horowitz | LAUNCH WINDOW: | DEORBIT BURN: | ACTUAL: | SEW17 | | | | DEPLOYED: | 800 amp Zarya batteries. Also, this was first flight of Shuttle | |
| <u>PAD</u> 39A-56 | RPO4-21 | (Flt 3 - STS-75, STS-82) | 5M4S BASED ON | <u>DEORBIT BURN:</u> 150:05:12:10Z | 100/104.5/ | ET | | | | DEPLOYED: 3371 LBS | "Glass Cockpit" upgrade. | |
| MLP-1 | FRC4-21 | P578/R210/V135/M183 | ISS IN-PLANE TIME | VDANCE OF ONA | 96/72/ | <u>IMPACT</u> | | | | | chase coonfin apgrade. | |
| IVILF - I | | MC 1. | | XRANGE: 95.8 NM | 104.5 | 1:26:29 | | | | NON-DEPLOYED: 20159 LBS | KSC W/D: OPF 333, VAB 8, PAD 50 = 391 days total. | |
| THIRD | | M/S 1: Mary Ellen Weber | EOM PLS: KSC | ORBIT DIR: AL 24 | 4 0040 (4) | MET | | | | 20159 LBS | 100 W/D | |
| SHUTTLE | | (Flt 2 - STS-70) | TAL: ZZA TAL WX: MRN, BEN | AIM PT: NOMINAL | 1 = 2043 (4) 2 = 2054 (1) | LAT. | | | | MIDDECK. | LAUNCH POSTPONEMENTS: | |
| FLIGHT TO | | P579/R198/V160/F26 | TAL WA: WKN, BEN | | 3 = 2034 (1) 3 = 2049 (3) | <u>LAT</u> : 1.955 | | | | MIDDECK: 1262 LBS | - Baselined 8/5/99 as launch date on 10/5/98. Postponed to | |
| ISS | | | SELECTED: | MLGTD: 3269 FT | 3 - 2047 (3) | 1.733 | | | | 1202 LD3 | 10/14/99, then 12/2/99. TACAN scars removed for GPS scar | |
| CDACELIAD | | M/S 2/EV1: | RTLS: KSC 15/CI/N | 150:06:20:19 Z | ALL BLOCK | LONG: | | | | SHUTTLE | then reinstated TACAN Postponed launch to 11/19/99 on 9/16/99. OV-103 wire | |
| SPACEHAB #14 | | Jeffrey N. Williams | TAL: ZZA 30/CI/N | VEL: 202 KGS 199 KEAS | | 127.3 W | | | | SHUTTLE ACCUMULATED | inspections and repair. | |
| #14 | | P580/R255/M222 | AOA: KSC 15/CI/N | HDOT: -2.0 FPS | | 4 | 13cm | | - 196 | WEIGHTS: | - Postponed launch to 12/2/99 on 10/22/99. OV-103 wire | |
| | | M/S 3/EV2: | PLS: EDW 04/N/SF | | The same | | | | | <u>DEPLOYED</u> : | inspections and repair. | |
| | | | TDEL: | TD NORM 205: | - | | 200 | | | 934208 LBS | - Postponed launch to 4/14/00 on 4/16/00. CDR training accident | |
| | | (Flt 4 - STS-44, STS-53, | TDEL: 0.09 -0.388/-0.19 | 2731 FT | 100 | | | 50.42 | | NON-DEPLOYED: 1462107 LBS | (ankle) | |
| | | 515-09) | | DRAG CHUTE | | AT THE | man in | The state of the s | | CARGO TOTAL: | - Postponed launch to 4/24/00 on 4/16/00. OV-104 Rudder/ | |
| | | P581/R136/V85/M121) | MAX Q NAV: | <u>DEPLOY</u> : 189 KEAS | A STATE OF THE PARTY OF THE PAR | BHHH | BBIR | HII | | 3002132 LBS | Speed Brake PDU R&R from OV-102. | |
| | | M/S 4: | 714 709 | 150:06:20:22 Z | A-Billian | | | | | | LAUNCH SCRUBS: | |
| | | Susan J. Helms | SRB STG: | NLGTD: 6752 FT | | MA T | | A | | <u>PERFORMANCE</u> | - Scrubbed 3:17:17 PM EDT (115:20:17:17Z) 4/24/00 launch | |
| | | (Flt 4 - STS-54, STS-64, | 2:04.8 2:04 | 150:06:20:30 Z | | 2 | - 25 | | | MARGINS (LBS): | attempt while holding at T-9 minutes due to high RTLS | |
| | | STS-78) | PERF: NOMINAL | VEL: 154 KGS 152 KEAS | | 6 OII = | | 116 011 | 1 | FPR: 3783 FUEL BIAS: 720 | crosswinds. Scrub was declared at approximately L-15 | |
| | | P582/R158/V108/F19 | PERF: NOMINAL | HDOT: -4.2 FPS | | | | | | FINAL TDDP: 733 | minutes, when RTLS crosswinds observed and forecast to | |
| | | <u>M/S 5</u> : | 2 ENG TAL (ZZA): | | SOUL SE | | | P. 100 | | RECON: 998 | exceed the 15-knot limit. | |
| | ALD | Yuri Usachev | 2:27 2:27 | BRK INIT: 102 KGS | | | \$5.00 C | | | 112001 1 . 770 | - Scrubbed 2:53:17 PM EDT (116:19:53:17Z) 4/25/00 launch | |
| HOROWITZ | | (Russia) | NEG RETURN: | DRAG CHUTE | | | Carried at 1 | | | PAYLOADS: | attempt at L-1:35:00 by Launch Director when RTLS crosswinds persisted in 29-30 knots range and were forecast to exceed limit. | |
| HELMS | A CONTRACTOR | P583/R256/M223 | 3:52 3:56 | <u>JETTISON</u> : 54 KGS | | 200 | BERG-N | 1 | | PLB: | RTLS Weather Scrub. | |
| VOSS | + + 300 | SSEVA #49 | | 150:06:20:57 Z | | FF4 2 | 0 1 1 mm | | 6 | 100 04 0 | - Scrubbed 2:34:16 PM EDT (117:19:34:177) 4/26/00 launch | |
| . WEB | ER | EMU TETHERED | PTA (U/S 269): | BRK DECEL (fps/s): | 1 | LIE | | | A A A A A A A A A A A A A A A A A A A | ISS 2A.2a Spacehab DM | attempt at 117:19:21Z (L-0H13M) while holding in T-9 min hold due to no TAL site. All three TAL sites were observed and | |
| | | EVA #42 | 4:42 4:47 | AVE 5.3 PK 6.6 | 000 044 | 47 4-14 | : I- 6 N A | EDOit | | ICC, SEM-06, MARS | due to no TAL site. All three TAL sites were observed and | |
| 1000 | | SCHEDULED EVA #43 | DROOP (ZZA): | WHEELS STOP: | 599- 014 | 17 1St fl | ignt ivi | EDS cockpit | | RMS, ODS | forecast NO GO: ZZA for showers within 20 nm and forecast | |
| | | DURATION 6:44 | 5:26 5:28 | 150:06:21:07 Z | | | | | | | chance of broken 4000 feet. MRN for showers/thundershowers and forecast chance of broken 3000 feet. BEN was observed and | |
| | | MOO MILITE FOR (00) | | 12182 FT | M 3 EOM: | | | | | | forecast NO GO for crosswind violation REN wind swing from | |
| | | MCC WHITE FCR (28) | PTM (U/S 269): 5:59 6:06 | POLLOUT: | WEIGHT: | | | DEORBIT: | | MIDDECK: | around 285 degrees to around 300 degrees after sundown did not | |
| | | FLIGHT DIRECTORS: A/E - J. P. Shannon | 0.09 | ROLLOUT: 8913 FT | 226277 LBS | | | APOGEE: | | CPCG | around 285 degrees to around 300 degrees after sundown did not materialize - crosswind forecast was steady state R11 and P16. The launch window opened 117:19:24:42Z and closed at 117:1934:16Z and the PLT was 117:19:29:13Z for a launch | |
| | | LD/O1 - P. L. Engelauf | SE TAL (ZZA): | 48 SEC | X CG: | | | 207.2 NM PERIGEE: | | PCG-BAG BIOTUBE | The launch window opened 117:19:24:42Z and closed at | |
| | | O2 - K. B. Beck | 6:02 6:02 | WINDS: | 1081.20 | | | 189.3 NM | | AST | 1717:1934:16Z and the PLT was 117:19:29:13Z for a launch | |
| N. C. | Unit | PLNG - C. W. Shaw | MECO CMD: | 2407P09 | | | | | | | window of 4M55S. TAL WX Scrub Unable to get May 9 launch date due to GOES launch delays. | |
| | | PLNG/O2 - L. E. Cain | 8:23.8 8:25.3 | SS:OH 7R | LANDING: | | | ENTRY | | | Scheduled a May 18 launch at 6:32:00 AM EDT. At | |
| My + + | | (Beck, Shaw, and Cain | | PK:IH 9R | WEIGHT: | | | VELOCITY: | | 5 CRYO TK SETS | approximately L-36 hours, the Atlas III launch scrub due to high | |
| TITOLOGIC | Tribut | switched shifts during flight.) | <u>VI</u> : 25931 25930 | DENS ALT: | 226212 LBS | | | 25899 FPS | | 6 GH2 TANKS | winds caused a slip to May 19. | |
| IS 2A. | 20 | ISS LD/01 - P. S. Hill | 20931 25930 | 1591 FT | v.cc. | | | ENTDV | | RMS 55 | ' ' | |
| | | ISS O2 - A. F. Algate | OMS-2: | | X CG: 1082.85 | | | ENTRY RANGE: | | RMS USED FOR | LAUNCH WINDOW: | |
| | | ISS PLNG - J. M. Curry | 43:04 43:04 | Continued | 1002.03 | | | 4449 NM | | EVA SUPPORT | - Window opened at 140:10:09:29Z and closed at 140:10:16:14Z | |
| | | MOD - J. W. Bantle | 81.3 FPS 81.4 FPS | | | | | | | | for a total window of 6M45S. Selected Preferred Launch Time (PLT) of 140:10:11:10Z for a launch window of 5M4S. | |
| | | | | | | | | | | | (1 L1) of 170.10.11.102 for a faulton william of 510143. | |
| | | | | | | | | | | | Continued | |
| | | | | | | | | | | | | |

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|----------|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| CTC 1011 | | | | Continued | | | | | | | Continued |

STS-101/ ISS 2A.2a

Continued.

S101-E-5048 – Williams/MS attaches Russian Crane (Strela) to ISS. Strela was delivered on STS- Continued...

FLT DURATION: 9:20:09:09

<u>S/T</u>: 845:17:27:28

OV-104: 160:18:39:34

DISTANCE: 5.076.281 sm



STS101-717-094 --- Inflight crew portrait on ISS Unity (Node 1). Rear (from left): Weber/MS, CDR Halsell, Williams/MS, & PLT Horowitz. Front: Helms/MS, Usachev/MS (RSA), & Voss/MS.



STS101-390-025 (19-29 May 2000) ---Helms/MS performs battery maintenance below floor of Zarva.



JSC2000-04279 - In JSC MCC: Flight Controllers huddle over I-load update for Day-of-Launch winds. From left: Larry Bourgeois/Space Ops, Steve Hawley/FCOD, FD Jeff Bantle: and Henry Cordova & Ed Gonzalez/Flight Design & Dynamics.

- <u>SIGNIFICANT ANOMALIES</u>:
 Left OMS Engine Bipropellant Valve 2 indicates open.
- Left OMS Engine GN2 regulator pressure low during Post-Firing Purges.
- Ku-band radiating within RF Protect Box.
 PRSD Oxygen Tank 4 Heater temporarily failed.
 Collins TACAN BITE faults.
- Slump tile at wing leading edge with internal flow.
- APCU 1 converter B failure.
- MEDS MDU CRT 2 display screen came up blank.
- Speedbrake Ch 3 secondary Delta Pressure delayed response

LAUNCH DELAYS: None

 Launched on time at 140:10:11:10Z, 6:11:10 AM EDT on Friday, May 19, 2000.

 Zaragoza (Prime and Selected), Moron, and Ben Guerir all forecast and observed GO.

PERFORMANCE ENHANCEMENTS:

- Standard Set Plus: (1) PE Operational - High Q TRN/APR, (2) OMS Assist is 4000 lbs, (3) 52 NM MECO, and (4) Del psi

FLIGHT DURATION CHANGES:

- One-day extension. Extended flight one day to accomplish ISS

SHUTTLE NIGHT LAUNCH #23

SHUTTLE NIGHT LANDING #14 - Landed on KSC runway 15 at 150:06:20:19Z, 2:20:19 AM EDT on Monday, May 29, 2000.

First flight of glass cockpit (MEDS)
First flight of OV-104 since STS-86 after OMDP.

ISS ring capture at 142:03:56:10Z

- Docked with ISS PMA2 Node 1 Forward Port at 142:04:44:09Z, 1:18:32:59 MFT
- EVA 1 Start at 143:01:52:58Z, 2:15:41:48 MET and End at
- 143:08:36:58Z, 2:21:25:48 MET, duration 6:44.

- 143:08:36:58Z, 2:21:25:48 ME I, duration 6:44.
 Reboost #1 Start at 145:00:02:11Z, 4:13:51:01 MET, 29.06 fps, final orbit 190 by 184 nm, increase approximately 9 nm.
 Reboost #2 Start at 146:02:14:01Z, 5:16:02:51 MET, 29 fps, final orbit 196 by 195 nm, increase approximately 9 nm.
 Reboost #3 Start at 146:23:32:38Z, 6:13:21:28 MET, 28.2 fps, final orbit 206.7 by 199.5 nm.
- Undocked at 147:23:02:38Z, 7:12:51:18 MET
- STS-101/2A.2a ISS Visitor Time is 5D:18H:18M:29S (Docking to Undockina)
- Total transfers: To ISS, 3371 lbs consisting of 2657 lbs dry cargo (IVA), 4 CWC's with 387 lbs H2O, and External (EVA) 327 lbs. From ISS, 1391 lbs. Net transfer to ISS was 1980 lbs.
- Completed air quality work, R&R FGB failed electrical equipment and FGB lifetime equipment. EVA tasks completed include installation of OTD and Strela cranes and ECOMM antenna R&R.

Rendezvous and dock with ISS at PMA2, Node 1 Forward Port.

| | LANDING SITE/ SSME-TI | | | | | | | | | | |
|--|-------------------------|---|--|--|--|--------------------------|-------|-----------------------------|---------|------------------------------------|---|
| | | CREW | LAUNCH CITE | LANDING SITE/ | SSME-TL NOM-ABORT | CDD | | ODDIT | | DAVLOAD | MICCION LIICHLICHTC |
| FLT | ORBITER | (7) | LAUNCH SITE, LIFTOFF TIME, | RUNWAY, CROSSRANGE | EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | ORBITER | | LANDING SITES. | LANDING TIMES | THROTTLE | AND | INC | HA/HP | 1 3 1 1 | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| NO. | | TITLE, NAMES | ABORT TIMES | FLT DURATION. | PROFILE | ET | IIVC | TIZVIII | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | & EVA'S | 7.5011.1.11.20 | WINDS | ENG. S.N. | | | | | EAR ERAMEITIO | 1 (6 / 6 / 6 / 6 / 6 / 7 / / / / / / / / |
| STS-106/ | OV-104 | CDR: | KSC PAD 39B | KSC 15 (KSC 52) | 104/104/ | BI-102 | | DIRECT | 01-27 | CARGO: | Brief Mission Summary: The goal of the STS-106 mission, 4th |
| ISS 2A.2b | (Flight 22) Atlantis | Terrence W. Wilcott (Flt 4 - STS-68, STS-79, | 252:12:45:47Z 8:45:47 AM EDT (D) | 264:07:56:44Z 3:56:44 AM EDT | 109% | RSRM | (4) | INSERTION | (4) | 34991 LBS | mission to ISS, was to prepare the Zvezda Service Module for |
| SEO | Aliantis | ŠTS-89) | 8:45:47 AM EDT (P) 8:45:47 AM EDT (A) | 3.30.44 AW LD I | PREDICTED: | 75 | | POST OMS-2: 176.4 X 85.0 | | PAYLOAD | the arrival, later in the year, of the first residents, Expedition |
| SEQ FLT #99 | | P584/R183/V130/M160 | Friday 22 | Wednesday 11 | 100/104.5/ | FT 400 | | | | CHARGEABLE: | 1 crew, to start a permanent human presence on the ISS outpost. |
| | OMS PODS: | PLT: | 9/8/00 (10) | 9/20/00 (10) | 104.5/72 104.5 | ET-103 SLWT-8 | | NM | | 23967 LBS | ομιροςι. |
| KSC-99 | LPO3-26 | Scott D. Altman | LAUNCH WINDOW: | DEORBIT BURN: | 104.5 | SEVVI-0 | STS | 106-712-028 | | DEPLOYED: | KSC W/D: OPF 66, VAB 5, PAD 22 = 93 days total. |
| PAD | RPO4-22 | (Flt 2 - STS-90) | 3:54 USING PLT (IN- | 264:06:50:07 Z | ACTUAL: | <u>ET</u> | | ntis crew four | | 5399 LBS | LAUNCH POSTPONEMENTS: |
| PAD 39B-43 | FRC4-22 | P585/R237/V161/M207 | PLANE TIME) | XRANGE: 203 NM | 100/104.5/ 98/72/104.5 | <u>IMPACT</u> 1:26:12 | | ich larger ISS | 3 | NON DEDLOVED: | - Baselined launch date of 8/19/00 on 2/17/00. |
| MID 2 | | M/S 1/EV1: | EOM PLS: KSC | ORBIT DIR: AL 25 | | MET | | e STS-101 | | NON-DEPLOYED: 17935 LBS | - Postponed launch to 9/8/00 on 5/17/00. |
| MLP-2 | | Edward T. Lu | TAL: ZZA | | 1 = 2052 (2) | | | arture with the | ∋ | | LAUNCH CODURC, None |
| FOURTH | | (Flt 2 - STS-84) P586/R222/V162/M194 | TAL WX: MRN, BEN | AIM PT: CLOSE IN | 2 = 2044 (4) 3 = 2047 (4) | <u>LAT</u> : 2.46°S | | tion of the | | MIDDECK: 1172 LBS | LAUNCH SCRUBS: None |
| SHUTTLE | | 1 300/102/101/194 | SELECTED: | MLGTD: 2951 FT | 3 - 2047 (4) | 2.40 3 | | sian Zvezda | | 1172 LD3 | LAUNCH WINDOW: |
| FLIGHT TO ISS | | <u>M/S 2</u> : | RTLS: KSC 33 N/N | 264:07:56:44Z VEL: 187 KGS | ALL BLOCK | LONG: | | a docked | | SHUTTLE | - Launch window opened at 252:12:42:01Z and closed at |
| | | Richard A. Mastracchio P587/R257/M224 | TAL: ZZA 30 N/N | 186 KEAS | IIA SSME'S | 128.1°W | _ | ress resupply | У | ACCUMULATED WEIGHTS: | 252:12:49:41Z for a total window of 7M40S. Preferred Launch Time (PLT) (In-Plane Time) was 252:12:45:47Z, 8:45:47 AM EDT, |
| SPACEHAB #15 | | 1 307/10237/101224 | AOA: NOR 17N/SFD PLS: EDW 22 N/N | HDOT: -2.5 FPS | | | ship. | | | DEPLOYED: | resulting in a launch window of 3M54S. |
| #15 | | <u>M/S 3</u> : | | TD NORM 205: | | | | | | 939607 LBS | LAUNCH DELAYS, None |
| | | Daniel C. Burbank P588/R258/M225 | TDEL: 0.09 -0.348/-0.31 | 1643 FT | | | | | | NON-DEPLOYED: | LAUNCH DELAYS: None - Launch occurred on time at 252:12:45:47Z, 8:45:47 AM EDT on |
| | | 1 300/10230/101223 | 0.07 -0.340/-0.31 | DRAG CHUTE DEPLOY: 180 KEAS | | | | | | | Friday, September 8, 2000. |
| | | M/S 4/EV2: | MAX Q NAV: | 264:07:56:46Z | | Vier | | | | CARGO TOTAL: 3037123 LBS | TAL WX: |
| | | Yuri Malenchenko (Russia) | 710 712 | <u>NLGTD</u> : 5485 FT | | | - | | | PERFORMANCE | - Zaragoza (Prime and Selected) and Moron (2-engine TAL) were |
| | | P589/R259/M226 | SRB STG: | 264:07:56:52Z | | - | | | | MARGINS (LBS): | - Zaragoza (Prime and Selected) and Moron (2-engine TAL) were both forecast and observed GO, Ben Guerir was forecast and |
| | | MOS | 2:03.4 2:02 | VEL: 153 KGS | | | A . | de. | | FPR: 3274 | observed NO GO for crosswinds. KSC RTLS forecast and observed precipitation within 20 nm; however, was GO based on |
| W | | M/S 5: Boris Morukov | PERF: NOMINAL | 153 KEAS HDOT: -6.3 FPS | | | C | gar. | | FUEL BIAS: 818 FINAL TDDP: 1940 | Flight Rule A2.1.1-6C4e, f. and g. LANDING SITE WEATHER |
| Teur | - TOO | (Russia) | | BRK INIT: 71 KGS | The same of the sa | - | 100 | | | RECON: 317 | CRITERIA [HC], "2-nm vertical clearance from the top of that |
| | 77 30 | P590/R260/M227 | 2 ENG TAL (ZZA): 2:28 2:23 | | | 4/4 | 1 | | | DAVI OADC: | shower and a 10-nm lateral clearance must be maintained along the approach paths" |
| | TE IE | SS EVA #50 | 2:28 2:23 | DRAG CHUTE JETTISON: 56 KGS | | - | Burn | CE SE | | PAYLOADS: | the approach paths |
| TRA TE | BE | EMU/TETHERED | NEG RETURN: | 264:07:57:23Z | | | | 1 | 34 | PLB: ISS-2A.2b | PERFORMANCE ENHANCEMENTS: |
| Z III | | EVA #43 | 3:52 3:52 | DDK DECEL EDGŽ | | | - | 20/15 | | Spacehab/DM | - Standard Set plus: (1) PE Operational High Q SUM/SEP, (2) OMS assist is 4000 lbs, (3) 52 NM MECO, and (4) Del Psi |
| | 200 | SCHEDULED EVA #44 DURATION 6:14 | PTA (U/S 267): | BRK DECEL FPS ² : AVE 2.7 PK 4.8 | - | | 3 | | | ICC (SHOSS Box, SOAR) | . , , , , , , , , , , , , , , , , , , , |
| WOTE A | O MORUS | | 4:39 4:38 | WHEELS STOP: | | NOW, 140 | | | | GAS (2) | FLIGHT DURATION CHANGES: |
| | WITE I | | PTM (U/S 267): | 264:07:58:02Z | M 3 EOM: WEIGHT: | | | DEORBIT: | | RMS, ODS | One-day extension. Extended Flight one day to accomplish additional ISS tasks. |
| | | | 5:47 5:46 | 12078 FT | WEIGHT: 222835 LBS | | | APOGEE | | MIDDECK: | |
| | Theat | | | ROLLOUT: | | | | 206 NM | | MIDDECK: CGBA | SHUTTLE NIGHT LANDING #15: |
| Lanta | + + 000 | | <u>SE TAL (ZZA</u>): 5:52 6:05 | 9127 FT 78 SEC | X CG: 1080.07 | | | PERIGEE 205 NM | | DTO EMU H/W | - Landed on KSC runway 15, orbit 185 at 264:07:56:44Z, 3:56:44 AM EDT on Wednesday, September 20, 2000. |
| 10.00 | 94 | | 3.52 0:05 | | 1000.07 | | | ZUJ INIVI | | EVA Tools | 25 . S.: 11341103444, 50ptottibol 20, 2000. |
| REPER STATE OF THE PARTY OF THE | 1800 | | SE PTM (U/S 827) | WINDS: 1306P09 | LANDING: | | | <u>ENTRY</u> | | | |
| 11/20 | Rost | | 6:49 6:48 | SS: 5H 2L | WEIGHT: 222774 LBS | | | RANGE: 4390 NM | | 5 CRYO TK SETS 6 GN2 TKS | |
| | ISS 2A.2b | | MECO CMD: | PK: 8H 4L | 222114 LD3 | | | 4070 INIVI | | RMS 56 | Continued |
| | | | 8:24.3 8:25.6 | DENS ALT: | X CG: | | | ENTRY | | | |
| | | Continued | Continued | 1761 FT | 1081.73 | | | VELOCITY: 25892 | | RMS USED FOR EVA SUPPORT | |
| | | Continueu | Continueu | Continued | | | | ZJ07Z | | LVA SUFFUKI | |
| | | | | | | | | | | | |

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THROTTLE

PROFILE

ENG. S.N.

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE |
|------------------------------------|---------|---|--|---|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS |
| STS-106/ ISS 2A.2b Continued | | Continued MCC WHITE FCR (29) FLIGHT DIRECTORS: A/E - N. W. Hale LD/O1 - P. L. Engelauf O2 - P. F. Dye | Continued VI: 25926 25928 OMS-2: 44:00 44:00 | Continued FLT DURATION: 11:19:10:57 S/T: 857:12:38:25 |
| | | O3 - K. B. Beck O4 - W. D.Reeves ISS LD/O1 - M. J. Ferring ISS O2 - J. M. Hanley ISS PLNG - R. E. LaBrode MOD - J. W. Bantle | 81 FPS 81 FPS 00:54 | OV-102: 172:13:50:31 DISTANCE: 4,919,243 sm |

STS106-349-002 (8-20 September 2000) --- This unique picture captures the cabin of Atlantis, the RMS arm, and part of the ISS.



ORBIT

HA/HP

STS106-373-019 --- Inflight crew portrait on ISS. Front, from the left, Malenchenko/MS (RSA), CDR Wilcutt, PLT Altman, Back, from left, Burbank/MS, Lu/MS & Mastracchio/MS, & Morukov/MS (RSA).





IN THE JSC MCC --- LEFT: (I to r) FD's Leroy Cain, Wayne Hale & Jeff Bantle await launch for "baton" handoff from Florida to Houston. CENTER: FCT Planning with FD Kelly Beck holding flight insignia. RIGHT: FD Orbit 4 Bill Reeves on console.

Continued...

PAYLOAD

WEIGHTS,

PAYLOADS/ EXPERIMENTS

FSW

EVENTS:

- OMS Assist Start 2:23 MET
- Orbiter/ISS capture at 254:05:51:16Z, 1:17:05:59 MET
- Docked to ISS PMA2 Node 1 Forward Port at 254:06:04:53Z. 1:17:19:06 MET.

MISSION HIGHLIGHTS

(LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS,

FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

- Shuttle ISS EVA #6. EVA Start at 255:04:46:47Z, 2:16:01:50 MET, EVA End 255:11:00:47Z, duration 6:14. Routed and connected 9 power, data, and comm cables between Zvezda (SM) and Zarya (FGB). Installed magnatometer to ISS for use as compass relative to Earth.
- Inert weight adjustment is -200 lbs. Reboost #1 Start at 255:12:28:47Z, 2:23:43:00 MET, 11 fps, altitude increase 3.2 nm, orbit 201 by 191 nm. - Reboost #2 - Start at 258:06:13:17Z, 5:17:27:30 MET, 11.4 fps,
- altitude increase 3.2 nm, orbit 203.4 by 195.3 nm. Reboost #3 Start at 259:06:45:47Z, 6:18:00:00 MET, 11.4 fps, altitude increase 3.4 nm, orbit 206.3 by 199.2 nm.
- Reboost #4 (Unplanned pre-mission) Start at 261:03:25:47Z, 8:14:40:00 MET, 11.6 fps, altitude increase 3.3 nm, orbit 208.6 by
- Undocked at 262:03:46:05Z, 9:15:00:18 MET
- STS-106/2A.2b crew ISS Visitor Time is 7:21:41:05 (Docking to Undockina).
- Total Transfers Shuttle to ISS, 5399 lbs (Includes 10 CWC's with 780 lbs of H2O.) ISS to Shuttle, 948 lbs. Net transfer to ISS
- Installed magnetometer and three SM battery blocks.
 Connected FGB/SM cables. R&R'ed and C/O two FGB battery systems. R&R'ed FGB limited life items, delivered exercise devices. Prepared crew quarters for Expedition 1 crew.

RENDEZVOUS #48:

Rendezvous and dock with ISS at PMA2, Node 1 Forward Port

SIGNIFICANT ANOMALIES:

- MNB APC5 60 ampere bus transient, power supply fail BITE Fuel Cell 1 $\rm H_2$ flowmeter failed OSL
- Aft Main Bus B current spike
- Loss of crew audio for OCA video conferencing
- Ku-band forward link lost
- -Z Star Tracker failure
- Left OMS Forward Fuel Probe failure
- Ops Recorder 1 defective tape segment
- ODS C/L Camera Harness Assembly failure
 ODS C/L Camera misalignment
- Camera C iris failed to fully close
- Left Vent 8 and 9 Drive Microswitch failures
- MSBLS 2 range failure

| | | | | LANDING CITE! | CCME TI | | | | | | |
|----------------------|--|---|-----------------------------|---|---|----------------------|-----------|--|--------------------|--------------------------------------|--|
| | | CREW | | LANDING SITE/ | SSME-TL | 000 | | 0.00.0 | | 544,645 | |
| | | (7) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (,, | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | & EVA'S | | WINDS | ENG. S.N. | | | | | | , |
| STS-92/ | OV-103 | CDR: | KSC 39A | EDW 22, CONC | 104/104/ | BI-104 | 51.60 | DIRECT | OI-27 | CARGO: | Brief Mission Summary: STS-92, the 5th mission to ISS, |
| | (Flight 8 | Brian Duffy | 285:23:17:00 Z | EDW 46, CONC 27 | 109% | 5 | (5) | INSERTION | (5) | 35250 LBS | delivered the first framework structure, Z1 truss, to house |
| ISS 3A | (Discovery) | (Flt 4 - STS-45, STS-57, | 6:17:00 PM EST | 298:20:59:42 Z | | RSRM | (-) | | (-) | | communications and motion control equipment; and |
| SEQ | , ,, | STS-72) | 6:17:00 PM EST | 12:59:42 PM PST | PREDICTED: | 76 | | POST OMS-2: | | PAYLOAD | |
| FLT # 100 | | P591/R142/V94/M126 | Wednesday 10 | | 100/104.5/ | | | 175.1 x 85.4 | | CHARGEABLE: | delivered the third Pressurized Mating Adapter docking |
| Ι L Ι π 100 | OMS PODS: | | 10/11/00 (10) | Tuesday 16 | 104.5/72/ | ET-104 | | NM | | 28009 LBS | station. This was the 100th mission of America's Space |
| KSC-100 | LPO1-31 | PLT: | | 10/24/00 (8) | 104.5 | | | T. D. IDA | | 0.501.01/50 | Shuttle. |
| | RPO3-29 | Pamela A. Melroy | LAUNCH WINDOW: | DEODDIT DUDN | ACTUAL | SLWT 9 | | <u>TI BURN</u> : 1/14:52 MET | | DEPLOYED: | W00.W/D 0DE 407.WAD 40 DAD 04 000 / W41 |
| PAD | FRC3-28 | P592/R261/F34 | 4:12 USING PLT | DEORBIT BURN: | ACTUAL: 100/104.5/ | | | 1/14:52 IVIE I | | 21998 LBS | KSC W/D: OPF 197, VAB 10, PAD 21 = 238 days total. |
| <u>PAD</u> 39A-57 | | M/S 1/EV1: | (IN-PLANE TIME) | 298:19:52:00Z | 100/104.5/ | | | ORBIT: | | NON-DEPLOYED: | LAUNCH POSTPONEMENTS: |
| | | Lerov Chiao | EOM PLS: KSC | XRANGE: 200 NM | 104.5/72/ | | | 206.2 X 200.1 | | 4678 LBS | - Baselined launch date of 7/23/98 on 3/13/97 |
| MLP-3 | | (Flt 3 - STS-65, STS-72) | TAL: ZZA | | 107.0 | | | NM | | 70/0 LD3 | - Baselined laurich date of 7/23/98 off 3/13/97 - Postponed laurich to 1/14/99 on 5/27/97. ISS Flight Delays |
| EIETL/ | | P593/R179/V125/M157 | TAL WX: MRN, BEN | ORBIT DIR: AL 26 | 1 = 2045 (3) | | | 1 41 41 | | MIDDECK: | - Postponed launch to 6/17/99 on 6/4/98. ISS Flight Delays |
| FIFTH | | 1757117777120771107 | WING OF DEIV | AIM PT: NOMINAL | 2 = 2053 (2) | | | | | 1333 LBS | - Postponed launch to 12/2/99 on 2/4/99. ISS Flight Delays |
| SHUTTLE FLIGHT TO | | M/S 2/EV2: | SELECTED: | AIIVI I I. INOIVIIINAL | 3 = 2048 (2) | STS09 | 2-S-022 | 2 [EC00-0311-0 | 3] | | - Postponed launch to 6/14/00, then to 10/28/99, to 9/21/00, to |
| ISS | | William S. McArthur | RTLS: KSC 33 N/N | MLGTD: 2656 FT | | | | R 2000) | | SHUTTLE ACCUMULATED | 10/5/00 due to ISS Service Module Delays |
| 133 | | (Flt 3 - STS-58, STS-74) | TAL: BEN 36 CI/N | 298:20:59:42Z | ALL BLOCK | | | ding at EAFB | of | <u>ACCUMU</u> LATED | , |
| | | P594/R172/V124/M150 | AOA: KSC 33 N/N | VEL: 205 KGS | IIA ENGINES | | | tle mission – "S | | WEIGHTS: | LAUNCH SCRUBS: |
| | | | PLS: EDW CI/N | 201 KEAS | | young | | | | DEPLOYED: | - Scrubbed launch on EST date of 10/5/00 at ET Tanking MMT |
| | | M/S 3/EV3: | TDEL | HDOT: -2.9 FPS | | young t | , , | 1710. | | 961605 LBS | due to Orb/ET Attach Bolt Protrusion. Launch was scheduled for |
| | | Peter J. K. (Jeff) Wisoff (Flt 4 - STS-57, STS-68, | TDEL: 0.00 -0.04 | TD NORM 195: | | | | | | <u>NON-DEPLOYED</u> : 1487225 LBS | 9:38:46 PM EST (280:01:38:46Z GMT date of 10/6/00). A Review of STS-106 ET 35 mm film revealed RH Orbiter/ET attach |
| | | STS-81) | 0.00 -0.04 | 3287 FT | | | | | | CARGO TOTAL: | |
| | | P595/R166/V110/M145 | MAX Q NAV: | DDAC CUUTE | | | | | | 3072373 LBS | bolt protruding several inches causing concern for bolt contact with Orbiter during sep sequence with potential for a tip load and |
| | | 1 373/10100/ 1 10/10/143 | 752 748 | DRAG CHUTE DEPLOY: 188 KEAS | | | | | | 3072373 ED3 | subsequent ET/Orbitor contact. Film review of additional flights |
| 4 | | M/S 4/EV4: | 710 | 298:20:59:46Z | | | | | | PERFORMANCE | subsequent ET/Orbiter contact. Film review of additional flights and loads analyses needed to clear STS-92 launch. During |
| | 1 | Michael E. Lopez-Alegria | SRB STG: | | | | | | | MARGINS (LBS): | recycle. POGO valve #2 did not get an open indication when |
| CUFFY | MELO | (Flt 2 - STS-73) | 2:02.6 2:02 | NLGTD: 6504 FT | 1 | The same | | | The same | FPR: 3274 | recycle, POGO valve #2 did not get an open indication when valve was cycled open. Replaced POGO valve with launch date |
| ATT. | 101 | P596/R202/V163/M175 | | 298:20:59:54Z VEL: 144 KGS | 6 | | | - 10 | THE REAL PROPERTY. | FUEL BIAS: 818 | of 10/9/00. Completed film review and analyses which cleared |
| E. F. | E E | | PERF: NOMINAL | 152 KEAS | | | COLUMN TO | | | FINAL TDDP: 1532 | protruding bolt concern (within pogo valve replacement time.). |
| ZH | 星 | <u>M/S 5</u> : | (| HDOT: -6.7 FPS | 1 | | N Maria | 4 | 250 | RECON: 2330 | Technical Scrub Reset launch for 10/9/00 EST 10/10/00 GMT |
| 3 | 77 | Koichi Wakata | 2 ENG TAL (BEN): | | | | 11/10/20 | | | DAN/I OADO | - Scrubbed launch on EST date of 10/9/00 at ET Tanking MMT due to wind gusts greater than 42 knots holding up extension of the GO ₂ Vent Arm. Ran out of time to complete work in time for launch at 8:05:17 PM EST, 284:00:05:17Z GMT date of 10/10/00 |
| | | (Japan) | 2:25 2:27 | BRK INIT: 67 KGS | The Real Property lies | | | | 1 | PAYLOADS: | due to wind gusts greater than 42 knots holding up extension of |
| Ku | 0,, | (Flt 2 - STS-72) P597/R208/V164/M181 | NEG RETURN: | DRAG CHUTE | CONTRACTOR OF THE PARTY OF THE | | photo a | and the second second | dinis | PLB: ISS-3A | Ine GO ₂ vent Arm. Ran out of time to complete work in time for |
| TSOFF W | MATA CHIM | P397/R200/V104/W1101 | 3:57 3:57 | JETTISON: 55 KGS | CONTRACTOR OF THE PARTY OF THE | CHLAN | Marie A | THE RESERVE OF | - | ISS Z1 TRUSS | (3.5 hours work after arm extension before tanking could start at |
| | The state of the s | | 3.37 | 298:21:00:21Z | - 15000 | Service | | | 1 | CMG'S | L-8.5 hour). Weather Scrub. Reset launch for 10/10/00 at |
| | | SS EVA #51 | PTA (U/S 282): | | Attended | N. St. White | 250 m | 10 10 10 10 10 10 10 10 10 10 10 10 10 1 | | KU/S-BAND | 7:39:36 EST. |
| | | EMU/TETHERED | 4:40 4:41 | BRK DECELFPS ² : AVE 3.5 PK 5.3 | | | | | | PMA-3/SLP | - Scrubbed 10/10/00 launch at L- 1H07M due to a concern for |
| 8 | 7 2 | EVA #44 | | AVE 3.5 PK 5.3 | M 3 EOM: | <u>ET</u> | | DEORBIT: | | ICBC30 | debris damage by a wayward pip pin and tether seen on the LO ₂ |
| 8 | The state of the s | SCHEDULED EVA #45 | PTM (U/S 282): | WHEELS STOP: | | BRKUP: | | APOGEE | | RMS, ODS | feedline foam inboard support bracket. Pip pin was discovered |
| 1 | 1 + 1 m | DURATION 6:28 | 5:56 6:05 | 298:21:00:49Z | WEIGHT: | 283 K | | 213 NM | | MIDDEOK | during ice/debris team walkdown. (Launch had been scheduled |
| 3 | + | CC EVA #E2 | CE 774 | 11746 FT | 205188 LBS | | | PERIGEE | | MIDDECK: | for 7:39:36 EST. Technical scrub. Reset launch for 10/11/00. |
| | | SS EVA #52 | <u>SE ZZA:</u> 6:02 6:02 | ROLLOUT: | X CG: | <u>E I</u> IMPACT | | 200.9 NM | | DTO | LALINGLIANINDOM |
| | | EMU/TETHERED EVA #45 | 6:02 6:02 | ROLLOUT: 9090 FT | 1079.95 | 1:26:22 | | | | EMU H/W EVA TOOLS | LAUNCH WINDOW: |
| | No. | SCHEDULED EVA #46 | SE PTM: | 67 SEC | 1017.70 | MET | | ENTRY | | LVATOOLS | - Total launch window was 7M58S. Window opened at 285:23:13:14Z and closed at 285:23:21:12Z. Selected Preferred |
| ISS-3 | A/STS-92 | DURATION 7:08 | 6:48 6:55 | WINDS: | | | | RANGE: | | | Launch Time (PLT) of 285:23:17:00Z (in-plane time) giving a |
| | | | | 2009P16 KTS | LANDING: | LAT: | | 4352 NM | | 5 CRYO TK SETS | launch window of 4M12S. |
| | | | MECO CMD: | SS: 8H 4L | | 2.00 S° | | | | 6 GH2 TKS | |
| | | | 8:25.3 8:25.6 | PK: 15H 7L | WEIGHT: | | | <u>ENTRY</u> | | | LAUNCH DELAYS: None |
| | | O and the cond | O and the second | DENS ALT: | 205129 LBS | LONG: | | VELOCITY: | | 0 1 | - Launched on time at 285:23:17:00Z, 6:17:00 PM EST on |
| | | Continued | Continued | 3743 FT | V CC. | 127.7°W | | 25901 | | Continued | Wednesday, October 11, 2000. |
| | | | | | X CG: 1081.77 | | | | | | Continued |
| | | | | Continued | 1001.77 | | | | | | Continued |
| | | | | | | | | | | | |

Continued...

CDACE CHITTLE MICCIONS CHMMADV

| | | | SP | ACE SHU | JIILE | MIS | SIO | NS SU | MIN | IARY | Page 2-128 - STS-92/3A |
|------------------------------|--------------------------|---|--|---|---|--------------------------|------------|----------------|---------|--|--|
| FLT NO. | ORBITER | CREW (7) TITLE, NAMES & EVA'S | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS | SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N. | SRB RSRM AND ET | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-92/ ISS 3A Continued | | & EVA'S Continued SS EVA #53 EMU/TETHERED EVA #46 SCHEDULED EVA #47 DURATION 6:48 SS EVA #54 EMU/TETHERED EVA #47 SCHEDULED EVA #48 DURATION 6:56 MCC WHITE FCR (30) FLIGHT DIRECTORS: Asc - N. W. Hale Ent - L. E. Cain LD/03 - C. W. Shaw O1 - R. E. Castle O2 - J. P. Shannon O4 - B. P. Austin ISS LD/O1 - S. P. Davis ISS O2 - M. A. Kirasich ISS Plng/O3 - R. E. LaBrode MOD - J. M. Heflin | Continued VI: 25931 25928 OMS-2: 43.30 43.33 82.4 FPS 82.1 FPS 00:54 00:54 | WINDS Continued FLT DURATION: 12:21:42:42 S/T: 870:10:21:07 OV-103: 217:05:38:18 DISTANCE: 5,331,301 sm | ENG. S.N. In-flight cra/MS (NASD | ew port | R Duffy | , & McArthui | r/MS. | Continued RMS 57 (S.N. 301) RMS USED FOR OSVS checkout, Z1 truss grapple and install on ISS and EVA support PMA3/SLP on Z1 | Continued TAL WX: - Zaragoza (prime) forecast and observed NO GO for rain, Moron forecast and observed NO GO for violent storms, Ben Guerir (selected) Obar 353 vs. 350 limit at 1100 feet cleared by L-10 minute balloon. NOTE: PTA set on AOA FOR KSC even though forecast showed chance of rain and chance 4000 ft broken and peak winds of 13 knots. EDW and NOR down for AOA/PLS, FD2 PLS would have resulted in additional 10 second TAL exposure. PERFORMANCE ENHANCEMENTS: - Standard Set Plus: (1) PE Operational High Q TRN/OCT, (2) OMS assist is 4000 lbs, (3) 52 nm MECO, and (4) Del Psi Note: OMS Assist Time reduced from 102 seconds to 41 seconds with DOLILU uplink (2400 lbs more OMS to orbit) Inert weight adjustment is 199 lbs; was -200 lbs. SHUTTLE NIGHT LAUNCH #24 FLIGHT DURATION CHANGES: - Total Flight duration extension was 2 days plus 3 orbits EDW was not called up for NEOM Did not close PLBD's. Waved-off landing at KSC on orbits 170 and 171 due to sustained high SLF crosswinds. EOM+1. Waved-off landing at KSC on orbits 186 and 187 (Did not close PLBD's or crew in suits) due to high crosswinds Retargeted to EDW on orbit 187, then waved-off due to broken ceiling and showers within 30 nm Targeted EDW on orbit 188, closed PLBD's, and put crew in suits. Waved-off landing at EDW on orbit 189 at Tig-1 hour for showers and rain within 30 nm. NOEM+2. Activated NOR for EOM+2. Did not attempt to land at KSC on orbits 201 and 202 due to forecast and observed showers and rain within 30 nm. NOEM+2. Activated NOR for EOM+2. Did not attempt to land at KSC on orbits 201 and 202 due to forecast and observed high crosswinds, low ceiling, and rain within 30 nm. Landed at EDW runway 22 on orbit 203 at 298:20:59:42Z, 12:59:42 PM PST, Tuesday, October 24, 2000. EVENTS: - Ring capture at 287:17:45:10Z, 1:18:28:10 MET - Docked at PMA2 Node 1 Forward Port at 287:17:57:55Z - Z1 Truss grapple at 290:15:43:30Z, PMA release at 290:17:59:35Z - EVA 2 Start at 290:11:4:32Z, duration 6H48M ISS Reboost maneuver #1 Start |
| ГИДЗЕ S | Щ НКО КРИК HEPHERD | АЛЁВ | | ear, from the left: | T ET Welloy | , Orliao. | TWO, LC | pez-Alegha | , ivio. | | - ISS Reboost maneuver #2 Start at 291:22:45:59Z, 5:23:28:59 MET, 5.8 fps, 1.5 nm, 211 by 202 nm. - EVA 4 Start at 292:15:00Z, duration 6H56M. - ISS Reboost maneuver #3 Start at 292:22:23:32Z, 6:23:06:32 MET, 5.6 fps, 1.5 nm, 214 by 202 nm. |

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|--------------|-------------------------------|--|-------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, | THROTTLE PROFILE | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | & EVA'S | | WINDS | FNG S N | | | | | | · · · · · · · · · · · · · · · · · · · |

Continued...



LEFT: JSC2000-E-26675 --- Astronauts Peter J.K. (Jeff) Wisoff and Michael Lopez-Alegria participate in final of four STS-92 space walks, including a run with SAFER backpack."

BELOW: JSC2000-06403 --- Wayne Hale (front center), Ascent Flight Director for the STS-92 mission, poses with the 50-odd flight controllers who supported his shift.



JSC2000-E-26636--- ISS after installation of Z1 Truss. From the top, elements are the Zvezda, the FGB or Zarya, Node 1 or Unity, and Z1.



Continued...

- EVENTS: (Continued) Undocked at 294:15:08:21Z, 8:15:51:21 MET
- Total transfers to ISS 21998 lbs (includes Z1=18351 and PMA3=2549 lbs).
- Delivered Z1 Truss. Mated Z1 to Node 1 zenith port. Installed CMG jumper. Z1 umbilicals connected and powered. Delivered PMA3 and berthed to Node 1 Nadir Port, umbilicals connected. SGANT deployed. Relocated IAPFR and Z1 FRGF. Installed two DDCU's and ETSD on Z1.
- STS-92/3A ISS Visitor Time 6:21:10:26.
- ISS Visitor time 6D21H10M26S

RENDEZVOUS #49:

Rendezvous and dock with ISS at PMA2 Node 1 Forward Port

- SIGNIFICANT ANOMALIES:
 Airlock Depress Valve Cap came loose from tether and was lost
 FES Primary B shutdown in Full-Up mode.
 Cabin Payload 3 Bus loss, which powered OIU 1, OSVS, ODS C/L Camera.
- EMU Middeck Battery Charger ready indication failure

 APFR/IAPFR interference with flush side-mounted WIF's
- Modular Mini Workstation anomaly
- Pistol Grip tool chatter Difficulty mating PMA 3 P607 to Node J609 Ku-band lost forward link
- WSB 2 failed to cool
- ODS C/L Camera misalignment WSB 2 GN₂ Relief Valve high cracking P and low reseat P. DSC OM2 Card 22 failure
- WSB 3 Steam Vent Heater erratic

| | | | | LANDING SITE/ | SSME-TL | | | | | | |
|-----------------|--------------|--|--|---------------------------------------|------------------------------|--------------------------|--------|----------------------------|---------|-------------------------------|--|
| | | CREW | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (5) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | ORDIT | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | ORDITER | | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | 1 3 4 4 | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| NO. | | TITLE, NAMES | ABORT TIMES | FLT DURATION. | PROFILE | ET | IIVC | ПА/ПР | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | & EVA'S | ADURT HIVES | WINDS | ENG. S.N. | EI | | | | EAPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| CTC 07/ | OV-105 | CDR: | KSC 39B | KSC 15 (KSC 53) | 104/104/ | BI-103 | E1 40 | DIRECT | OL 27 | CARGO: | Data SAM and an Community The CTC 07/44 and and an other land |
| STS-97/ | (Flight 15) | Brent W. Jett | 226.02.06.01 7 | 346:23:03:23Z | 104/104/ | BI-103 | (6) | INSERTION | (6) | 42804 LBS | Brief Mission Summary: The STS-97/4A mission, 6th mission |
| ISS 4A | (i light 15) | (Flt 3 - STS-72, STS-81) | 336:03:06:01 Z 10:06:01 PM EST (P) | 6:03:23 PM EST | 10770 | RSRM | (0) | INSLITION | (0) | 42004 LD3 | to ISS, helped "Station spread its wings". The 17-ton P6 |
| CEO | Endeavour | P598/R206/V132/M179 | 10:06:01 PM EST (A) | 0.00.201 W 201 | PREDICTED: | 72 | | POST OMS-2: | | PAYLOAD | Integrated Truss Segment (the 1st of four such sets) was |
| SEQ FLT #101 | | | Thursday 30 | Monday 19 | 100/104.5/ | | | 175.1 X 106.2 | | CHARGEABLE: | delivered and installed on ISS. With the deployment of its |
| I L I # I U I | OMS PODS: | PLT: | 11/30/00 (13) | 12/11/00 (12) | 104.5/72/ | ET-105 | | NM | | 37486 LBS | 240-foot solar arrays the ISS could now provide more |
| KSC-101 | LPO4-22 | Michael J. Bloomfield | L ALINIOLLIA/INIDOM | DEODDIT DUDN | 104.5 | CLIMIT 40 | | TI DUDN | | DEDLOVED | electrical power than on any spacecraft before it. This was |
| | RPO1-29 | (Flt 2 - STS-86 P599/R227/V165/M198 | <u>LAUNCH WINDOW:</u> 4M01S USING PLT | <u>DEORBIT BURN:</u> 346:21:57:31Z | ACTUAL | SLWT 10 | | TI BURN: 1:14:26:43 MET | | DEPLOYED: 36213 LBS | also the 1st Shuttle to visit an inhabited ISS. |
| PAD 39B-44 | FRC5-15 | P399/R22//V103/W1198 | (IN-PLANE TIME) | 340:21:37:312 | ACTUAL: 100/104.5/ | СТ | | 1:14:20:43 IVIE I | | 30213 LBS | KSC W/D: OPF 203, VAB 5, PAD 26 = 234 days total. |
| | | M/S 1/EV1: | (IIV-FLAINL TIIVIL) | XRANGE: 20 NM | 104.5/72/ | IMPACT | | ORBIT: | | NON-DEPLOYED: | NSC WID. OPF 203, VAB 3, PAD 20 = 234 days total. |
| MLP- 1 | | Joseph R. Tanner | EOM PLS: KSC | ORBIT DIR: AR 8 | 104.5 | 1:26:32 | | 199.6 X 204 NM | | 719 LBS | LAUNCH POSTPONEMENTS: |
| SIXTH | | (Flt 3 - STS-66, STS-82) | TAL: ZZA | | | MET | | | | | - Baselined launch date of 4/8/99 on 11/6/97 |
| SHUTTLE | | P600/R185/V136/M162 | <u>Tal wx</u> : Mrn, ben | <u>AIM PT</u> : CLOSE IN | 1 = 2054 (2) | | | MC-4: 1:15:50:55Z | | MIDDECK: | - Postponed launch to 8/5/99, 2/3/00, 3/23/00, 7/20/00, 12/2/00, |
| FLIGHT TO | | 1400 | OF LEOTED | MLGTD: 2360 FT | 2 = 2043 (5) 3 = 2049 (4) | LAT: | | 1:15:50:55Z | | 1021 LBS | and then 11/30/00 EST (12/1/00 GMT date). The primary cause |
| ISS | | M/S 2: | SELECTED: | 346:23:03:23Z | 3 = 2049 (4) | 1.54°S | | ODDIT | | CULUTTUE | for postponements was Service Module late delivery to ISS. |
| | | Marc Garneau (Canada) | RTLS: KSC 33 N/N TAL: ZZA 30 SF/N | VEL: 196 KGS | ALL BLOCK | LONG: | | ORBIT: 205.5 X 201.3 | | SHUTTLE ACCUMULATED | LAUNCH SCRUBS: None |
| | | (Flt 3 - STS-41-G, STS-77) | AOA: KSC 33 N/N | 199 KEAS | IIA ENGINES | 127.4°W | | NM | | WEIGHTS: | LAUNCH SCRUDS. Notice |
| | | P601/R47/V128/M44 | PLS: EDW 4 N/N | HDOT: -3.5 FPS | II/Y EIVOINES | 127.7 VV | | TVIVI | | DEPLOYED: | LAUNCH WINDOW: |
| | | | <u></u> | TD NORM 195: | | | | 1 | | 997818 LBS | - Total launch window was 7M45S Window opened at |
| | | M/S 3/EV2: | TDEL: | 2783 FT | | | 16 | 7 14 | | NON-DEPLOYED: | 336:03:02:17Z and closed at 336:03:10:02Z. Selected Preferred |
| | | Carlos I. Noriega | 0.11 -0.048/-0.01 | NLGTD: 5839 FT | | | | ~ 00 | | 1488965 LBS | Launch Time (PLT) of 336:03:06;01Z (In-plane time) resulting in a |
| | | (Flt 2 - STS-84) | MAN O NIAN | 346.23.03.357 | 10 - | * | 11 | | | CARGO TOTAL: 3115177 LBS | launch window of 4M01S. |
| | | P602/R221/V166/M193 | MAX Q NAV: 758 753 | VEL: 138 KGS 144 KEAS | | STORY THE REAL PROPERTY. | 200 | | 27 | 31131// LBS | LAUNCH DELAYS: None |
| | | | 750 755 | 144 KEAS | | alum . | | | | PERFORMANCE | - Launched on time at 336:03:06:01 GMT on December 1, 2000 |
| | | SS EVA #55 | SRB STG: | HDOT: -6.5 FPS | | | | | | MARGINS (LBS): | (at 10:06:01 PM EST on Thursday, November 30, 2000) |
| | | EMU/TETHERED | SRB STG: 2:03.5 2:03.0 | DRAG CHUTE | - | 200 | 70 | | | FPR: 3274 | (at 10:06:01 PM EST on Thursday, November 30, 2000). - Note: During the count, a loose Firex line bracket/clamp was |
| | | EVA #48 | | DEPLOY: 189 KEAS | Co. | A A | 面上 | | | FUEL BIAS: 818 | discovered on OAA, which was rolled back to allow access and |
| | | SCHEDULED EVA #49 | <u>PERF</u> : NOMINAL | 346:23:03:27Z | | THE PERSON NAMED IN | Labour | | | FINAL TDDP: 1920 | removal using a 180 foot condor crane. No impact to launch. |
| | | DURATION 7:33:23 | 2 ENG TAL (ZZA): | BRK INIT: 88 KGS | | | - | | | RECON: 2032 | TAL MANA |
| | - | SS EVA #56 | 2:43 2:40 | DRAG CHUTE | | | | | | PAYLOADS: | TAL WX: - Zaragoza (prime and selected) was forecast and observed GO, |
| JELD JE | G | EMU/TETHERED | | <u>JETTISON</u> : 70 KGS | S97-E-503 | 1 /F Door | | 2000) | | PIR | Moron was forecast and observed NO GO due to low ceiling, and |
| W. | Pa | EVA #49 | NEG RETURN: | 346:23:03:53Z | | | | newly deployed | , | PLB: ISS-4A | Ben Guerir (2-engine TAL call) was forecast and observed GO. |
| 0 | E E | SCHEDULED EVA #50 | 3:51 3:54 | DDV DECEL EDG/C | ISS solar a | | | newly deployed | ı | PV module P6 | (=g, |
| B | 7 5 | DURATION 6:37:19 | PTA (U/S 265): | BRK DECEL FPS/S: AVE 4.6 PK 6.7 | 155 Solai a | may pane | 1. | | | ICBC3D | PERFORMANCE ENHANCEMENTS: |
| er . | o o | CC EVA #57 | 4:54 4:54 | | MAROM | | | | | RMS, ODS | - Standard Set plus: (1) PE Operational High Q WIN/DEC, (2) |
| 32 | S. S. S. | SS EVA #57 EMU/TETHERED | DTM (II/C 24E). | WHEELS STOP: 346:23:04:20Z | M 3 EOM: | | | DEORBIT: | | | OMS assist is 4000 lbs, (3) 52 NM MECO, (4) No roll to heads up, |
| 4 | 40 | EVA #50 | PTM (U/S 265): 5:54 5:53 | 10340 FT | WEIGHT: | | | APOGEE | | MIDDECK: | and (5) Del Psi |
| 888 | S | SCHEDULED EVA #51 | | | 197829 | | | 198 NM | | HEDS tech demo | FLIGHT DURATION CHANGES: None |
| | | DURATION 5:09:49 | SE TAL (ZZA) | ROLLOUT: 7980 FT | | | | PERIGEE | | EMU H/W, | - Landed at KSC runway 15 on orbit 170. MLGTD at |
| 2000 | | | 5:55 5:55 | 57 SEC | X CG: | | | 188.5 NM | | EVA Tools | 346:23:03:23Z (10:19:57:22 MET) on Monday, December 11, |
| p6 | POWER MODULE | | SE PTM | | 1085.85 | | | | | | 2000. |
| | | - | 6:55 6:58 | <u>WINDS</u> : 6H 2L | | | | ENTRY RANGE: | | ב כמעט דע כבדכ | CHUITTI E MICHT I ALIMON //25 |
| | 1 | | | 6H 2L OFFICIAL: | LANDING: | | | 4338 NM | | 5 CRYO TK SETS 5 GN2 Tanks | SHUTTLE NIGHT LAUNCH #25 |
| | A HITT | | MECO CMD: | 1406P09 | LAINDING. | | | ENTRY | | RMS 58 | SHUTTLE NIGHT LANDING #16 |
| 1 | • | * A | 8:24.3 8:25.9 | SS: 6H 1L PK: 9H 2L | WEIGHT: | | | VELOCITY: | | TAIN OU | - Landed on KSC runway 15 on orbit 170 at 346:23:03:23Z, |
| | | 1 | | PK: 9H 2L | 197781 LBS | | | 25877 | | RMS USED FOR P6 | 6:03:23 PM EST on Monday, December 11, 2000. |
| 165 | | | Continued | Cantinuad | | | | | | TRUSS AND EVA | |
| .38. | 4A STS-ST | | | Continued | X CG: | | | | | SUPPORT | |
| | | Continued | | | 1087.73 | | | | | | Continued |
| | | Continued | | | 1 | | | | | | |
| | | | | | | | | | | | |

SRB

RSRM

AND

ET

INC

SSME-TL NOM-ABORT

EMERG

THROTTLE

PROFILE

| FLT | ORBITER | CREW (5) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE |
|-------------------|---------|---|--|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS |
| STS-97/ ISS 4A | | Continued MCC WHITE FCR (31) | Continued VI: 25930 25928 | Continued DENS ALT: 1068 FT |
| Continued | | FLIGHT DIRECTORS: Asc - N. W. Hale Ent - L. E. Cain LD/O1 - W. D. Reeves O2 - P. L. Engelauf PLNG - K. B. Beck ISS LD/O2 - J. M. Hanley ISS O1 - J. M. Curry ISS PLNG - P. S. Hill MOD - J. W. Bantle | OMS-2: 43:10.6 43:14.6 121 FPS 119 FPS | FLT DURATION: 10:19:57:22 S/T: 881:06:18:29 OV-105: 155:05:44:02 DISTANCE: 4,476,164 sm |



STS097-326-031 (8 December 2000) --- The STS-97 and Expedition 1 crews pose for an historic portrait (1st Shuttle visit to inhabited ISS): Front row are (left to right) STS-97 CDR Jett, EXP 1 CDR William M. Shepherd, & STS-97 MS/Tanner. 2nd row (from the left) EXP 1 FE/Sergei K. Krikalev, STS-97 MS/Noriega, EXP 1 Soyuz CDR/Yuri P. Gidzenko, & STS-97 PLT/Bloomfield. In the rear is STS-97 MS/Garneau representing the Canadian Space Agency (CSA). Krikalev and Gidzenko represent the Russian Aviation and Space Agency.



ORBIT

HA/HP

JSC2000-E-29413 --- Flight Directors: Front row: Lead FD Bill Reeves (left), and Jeff Hanley. Back row, from the left: John Curry, Wayne Hale, LeRoy Cain, Paul Hill and Kelly Beck.



STS097-704-074 (9 December 2000) --- New ISS configuration following Endeavour undocking.

Continued...

EVENTS:

PAYLOAD

WEIGHTS,

PAYLOADS/

EXPERIMENTS

FSW

Ring capture at 337:19:59:35Z Docked with ISS PMA3 Node 1 Nadir Port at 337:20:11:47Z (1:17:03:59 MET)

MISSION HIGHLIGHTS

(LAUNCH SCRUBS/DELAYS,

TAL WEATHER, ASCENT I-LOADS,

FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

- RMS grapple of P6 Truss from PLB at 337:22:16:57Z, 1:19:19:59 MET. P6 moved to overnight park position and grapple released at 338:20:17:25Z, 2:17:11 MET.
- Hatch between orbiter and PMA3 was opened at 338:00:22:01Z, 1:21:16 MET
- EVA 1 Start at 338:18:34:46Z, 2:15:29:45 MET and End at 2:23:02:06 MET, duration 7:33:23. 2B Solar Array wing deployed, but had tensioning problem.
- RMS used to deploy P6 Truss to Z1 Truss. P6 Truss 4B SAW deployed.
- EVA 2 Start at 340:17:20:52Z, 4:14:14:51 MET and End 4:20:52:10 MET. duration 6:37:19
- EVA 3 Start at 342:16:12:13Z, 6:13:06:12 MET and End 6:18:16:01 MET, duration 5:09:49. EVA crew successfully tensioned SAW 2B.
- Undocked at 344:19:13:00Z (8:16:06:59 MET)
- Total Transfers from orbiter to ISS 1457 lbs, includes 773 lbs hardware and 7 CWC's with 684 lbs H₂O. Transfers from ISS to orbiter 227 lbs.
- ISS Visitor time 6:23:01:13 (docking to undocking).
- Delivered and mated P6 Truss to Z1. Deployed and activated 2B and 4B Solar Array wings. Deployed and activated PMV radiator, EETCS aft radiator. Relocated S-band Antenna Support assembly. ISS EPS reconfigured to power U.S. and Russian Seaments. FPP assembled and tested.

Rendezvous and dock with ISS at PMA2 Node 1 Nadir Port.

SIGNIFICANT ANOMALIES:

- Waste water quantity sensor dropouts
- Crew could not remove Cabin Temp Controller Actuator Pip Pin
- APCU 1 converters shutdown and APCU 2 tripped off.
- During EVA 1, EV2 reported equipment hook inadvertently openeď.
- EV1's WVS EMU TV not received
- EV2 reported during helmet light battery charging, battery overheated (bad battery).
- IPS workstation crashed, delaying execute package
- CPS application on IPS crashed
- Sequential Still Video processing anomaly
- ICBC3D Camera stopped filming
- Erratic RCS jet L5D oxidizer injector temp transducer
- F5R Fuel Injector temp sensor failure
- OCA/Audio malfunctions

| | | CDEW | | LANDING SITE/ | SSME-TL | | | | | | |
|--------------------|-----------------------|-----------------------------------|---|--|--------------------|-------------------|------------|--|--------------|------------------------------------|---|
| | | CREW (5) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (5) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | 01/40/ | | 1/00 004 | WINDS | ENG. S.N. | DL 405 | F4 (0 | DIDEOT | 01.00 | 0.4.0.0.0 | |
| STS-98/ | OV-104 (Flight 23) | CDR: Kenneth D. Cockrell | KSC 39A 38:23:11:16Z | EDW 22, CONC EDW 47, CONC 28 | 104/104/ 109% | BI-105 | (7) | DIRECT INSERTION | OI-28 (1) | <u>CARGO</u> : 39162 LBS | Brief Mission Summary: The STS-98/5A mission, 7th mission |
| ISS 5A | (i light 23) | (Flt 4 - STS 56, STS-69, | 6:11:16 PM EST | 51:20:33:06Z | 10770 | RSRM | (7) | INSERTION | (1) | 39102 LD3 | to ISS, delivered and installed the U.S. Destiny Laboratory |
| SEQ | Atlantis | STS-80) | 6:13:02 PM EST | 12:33:06 PM PST | PREDICTED: | 77 | | POST OMS-2: | | <u>PAYLOAD</u> | onto the forward port of the Unity Node. Destiny is the centerpiece for research on the ISS. The lab is 28 feet long |
| FLT # 102 | 0.40 0.00 | P603/R159/V121/M140 | Wednesday 11 | | 100/104.5/ | FT 40. | | 175.1 X 110.3 | | CHARGEABLE: | by 14 feet wide. Atlantis landed at EAFB, CA after two |
| | OMS PODS: LPO3-27 | PLT: | 2/7/01 (8) | Tuesday 17 2/20/01 (6) | 104.5/72/ 104.5 | ET-106 SLWT-11 | | NM | | 33286 LBS | consecutive days of wave offs at KSC, due to high winds, |
| KSC-102 | RPO4-23 | Mark L. Polansky | LAUNCH WINDOW: | 2/20/01 (0) | 104.5 | SLW1-11 | | | | DEPLOYED: | then clouds and rain on the third day. |
| PAD: 39A-58 | FRC4-23 | P604/R262/M228 | 4M42S USING PLT | DEORBIT BURN: | ACTUAL: | <u>ET</u> | | | | 32270 LBS | unon olouus unu rum on ule umu uuy. |
| MLP-2 | | | (IN-PLANE TIME) | 51:19:27:20Z | 100/104.5/ | <u>IMPACT</u> | | | | | KSC W/D: OPF 70, VAB 30 (2), PAD 28 (2) = 128 days total |
| | | M/S 1/EV2: Robert L. Curbeam | | XRANGE: 381 NM | 104.5/67/ 104.5 | 1:26:23 MET | | | | NON-DEPLOYED: 583 LBS | (Rollback to inspect SRB cables). |
| 05,45,17,1 | | (Flt 2 - STS-85) | EOM PLS: KSC | | 104.3 | IVIEI | | | | 303 LD3 | LAUNCH POSTPONEMENTS: |
| SEVENTH SHUTTLE | | P605/R225/V167/M195 | TAL: ZZA | ORBIT DIR: AL 27 | 1 = 2052 (3) | LAT: | | | | MIDDECK: | - Baseline launch date of 5/20/99 on 11/20/97 |
| FLIGHT TO | | 1410 0 | TAL WX: MRN, BEN | AIM PT: CLOSE IN | 2 = 2044 (5) | 1.73°S | | | | 983 LBS | - Postponed to 10/28/99, 2/3/00, 3/2/00, 4/20/00, 8/29/00, and 1/18/01 |
| ISS | | <u>M/S 2</u> : Marsha S. Ivins | SELECTED: | MLGTD: 1994 FT | 3 = 2047 (5) | LONG: | | | | SHUTTLE | - Postponed launch date to NET 2/6/01 when decision made to |
| | | (Flt 5 - STS-32, STS-46, | RTLS: KSC 33 N/N | 51:20:33:06Z VEL: 199 KGS | ALL 3 BLOCK | 127.9°W | | | | ACCUMULATED | roll back to VAB and inspect/x-ray SRB cables (Replaced damaged cables). |
| | | STS-62, STS-81) | TAL: ZZA 30 | VEL: 199 KGS 209 KEAS | IIA ENGINES | | | | | WEIGHTS: | - Set 2/7/01 launch date at FRR. |
| | | P606/R108/V77/F12 | AOA: KSC 33 N/N | HDOT: -2.5 FPS | | | | | | DEPLOYED: | LAUNCH SCRUBS: None |
| | | M/S 3/EV1: | PLS: EDW 22 N/N | TD NORM 195: | | | 100 | 71 | 100 | 1030088 LBS NON-DEPLOYED: | |
| | | Thomas D. Jones | TDEL: | 3540 FT | | | | -3/ | 12 | 1490535 LBS | LAUNCH WINDOW: |
| | | (Flt 4 - STS-59, STS-68, | 0.00 0.22/0.06 | NLGTD: 5635 FT | | | | | | CARGO TOTAL: | The total launch window was 9M02S, which opened at 38:23:06:56Z and closed at 38:23:15:58Z. The decision was |
| | | STS-80) P607/R177/V111/M155 | MAY O NAV | 51:20:33:18Z | | | 1 | | 3 | 3154339 LBS | Imade to use the Preferred Launch Time (PLT) of 38:23:11:16Z |
| | | P00//R1///V111/W155 | MAX Q NAV: 727 735 | IVEL: 133 KGS | 23 3 | | 0 | | · A | PERFORMANCE | (In-plane time) with a 4M42S launch window. |
| | | SS EVA #58 | | 144 KEAS HDOT: -5.9 FPS | | - | 1 | W- 1 | | MARGINS (LBS): | LAUNCH DELAYS: - During 1-9 hold, a step function was seen on APU 1 Turbine Speed (OA1 card 6). This proved to be a ground-processing problem; however, coming out of T-9 minute hold was 1m46s late, resulting in a launch delay of 1m46s. Launch occurred at 38:23:13:02Z, 6:13:02 PM EST on Wednesday, February 7, 2001. |
| | ž A | EMU/TETHERED | SRB STG: | | | | - Hr | 19/10/15 | 100 | FPR: 3274 | - During 1-9 hold, a step function was seen on APU 1 Turbine Speed (OA1 card 6). This proved to be a ground-processing |
| | | EVA #51 SCHEDULED EVA #52 | 2:05.6 2:06 | DRAG CHUTE DEPLOY: 206 KEAS | | | | The state of the s | The same | FUEL BIAS: 818 FINAL TDDP: 2138 | problem; however, coming out of T-9 minute hold was 1m46s |
| | (量) | DURATION 7:33:58 | PERF: NOMINAL | 51:20:33:08Z | | | | | | RECON: 1538 | late, resulting in a launch delay of 1m46s. Launch occurred at |
| <u> </u> | Z | 201011101111100000 | 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | BRK INIT: 58 KGS | | | T | | | | 30.23.13.022, 0.13.02 1 W E31 Off Wednesday, 1 ebidary 7, 2001. |
| SE SE | Or SNIM | SS EVA #59 | 2 ENG TAL (BEN): | | 0.70000 0 | 04 0047 / | 7.00 5 | .h | | PAYLOADS: | TAL WX: |
| : 1 3 | \$ //: | EMU/TETHERED EVA #52 | 2:34 2:37 | DRAG CHUTE JETTISON: 64 KGS | | | | ebruary 2001) ntis payload ba | 0)/ | PLB: ISS-5A (DESTINY) | - Zaragoza (prime and selected) and Ben Guerir (2-engine TAL call) were forecast and observed GO. Moron was forecast and |
| | | SCHEDULED EVA #53 | NEG RETURN: | 51:20:33:36Z | for installa | | | illis payload be | ay | U.S. LABORATORY | observed NO GO for ceiling and showers within 20 nm. |
| P. C. C. | 45/5 | DURATION 6:50 | 3:53 3:55 | | 101 II IStalia | | O . | | | RMS, ODS, | PERFORMANCE ENHANCEMENTS: |
| 33.00 | SCORE! | CC EVA #/O | DTA (IIIC | BRK DECEL FPS ² : AVE 4.7 PK 6.7 | M 2 FOM | | | | | SPDU | PERFORMANCE ENHANCEMENTS: - Standard Set Plus: (1) PE Operational High Q WIN/JAN, (2) OMS assist is 4000 lbs, (3) 52 NM MECO, (4) Del Psi |
| S 00 | | SS EVA #60 EMU/TETHERED | PTA (U/S): 4:48 4:46 | | M 3 EOM: | | | DEORBIT: | | MIDDECK: | UNIS ASSIST IS 4000 IDS, (3) 52 NM MECO, (4) DELPSI |
| | | EVA #53 | 1.70 | WHEELS STOP: 51:20:34:02Z | WEIGHT: | | | APOGEE | | SIMPLEX | FLIGHT DURATION CHANGES: - Total extension 2 days plus two orbits and changed landing site to EDW. |
| | | SCHEDULED EVA #54 | <u>PTM</u> : | 9964 FT | 197909 LBS | | | 210.8 NM | | BMRRM | - I otal extension 2 days plus two orbits and changed landing site |
| | | DURATION 5:25 | 5:50 5:46 | ROLLOUT: | V CC. | | | PERIGEE | | (LON) | - EDW was not called up for NEOM. Closed PLBD's, but waved- |
| D | ESTINY | | SE ZZA: | 7970 FT | X CG: 1080.06 | | | 196.2 NM | | 5 CRYO TK SETS | off landing at KSC on NEOM. Closed PLBD's, but waved- off landing at KSC on NEOM orbits 170 (Tig-24 mins) and 171 (Tig-36 mins) due to observed and forecast crosswind violations. Activated EDW for EOM+1. Closed PLBD's for EOM+1 but waved-off landing at KSC on orbit 186 for crosswind violations |
| | 4 | | 6:02 5:58 | 56 SEC | 1300.00 | | | ENTRY | | 6 GH2 TANKS | (119-30 mins) due to observed and forecast crosswind violations. Activated FDW for FOM+1. Closed PLBD's for FOM+1 but |
| 1 * . jii | | <u>(2)</u> | | <u>WINDS</u> : | <u>LANDING</u> : | | | VELOCITY: | | RMS 59 | waved-off landing at KSC on orbit 186 for crosswind violations |
| | | S. | <u>SE PTM:</u> 6:51 6:51 | 20H 1L | WEIGHT: | | | 25893 | | RMS USED FOR | land orbit 187 due to observed and forecast crosswind violations land precipitation. Waved-off landing at EDW on orbits 188 and |
| S | No the High | 8 | 6:51 6:51 | OFFICIAL: 23020P27 | 197854 LBS | | | ENTRY | | U.S. LAB TO | and orbit 187 due to observed and forecast crosswind violations and precipitation. Waved-off landing at EDW on orbits 188 and 189 due to forecast ceiling, crosswind, and precipitation violations. EOM+2. Waved-off landing at KSC on orbits 201 and |
| | | , | | SS: 20H 2R | | | | RANGE: | | NODE 1, PMA-2 | violations. EOM+2. Waved-off landing at KSC on orbits 201 and |
| * U | .5. LAB * | | | PK: 27H 3R | X CG: | | | 4350 NM | | TO LAB, AND | 202 due to forecast of low ceiling and precipitation. Landed at EDW runway 22 on orbit 203 at 12:33:06 PST on Tuesday, |
| | | Continued | Continued | | 1081.98 | | | | | EVA SUPPORT | February 20, 2001. |
| | | Continueu | Continueu | Continued | | | | | | | Continued |
| | | | | | | | | | | | |

| FLT | ORBITER | CREW (5) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|---------|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-98/ | | Continued | Continued | Continued | . Continued | | | | | | |

ISS 5A MCC WHITE FCR (32) FLIGHT DIRECTORS: Continued. A/F - L. F. Cain LD/O1 - R. E. Castle O2 - K. B. Beck PLNG/03 - B. P. Austin ISS LD/O2 - A. F. Algate ISS 01 - M. A. Kirasich ISS O3 - M. J. Ferring MOD - J. W. Bantle

MECO CMD DENS ALT: 8:24.7 FLT DURATION: 12:21:20:04 25928 25928 894:03:38:33 OMS-2: 43:46 43:45 OV-102: 185:11:10:35 127.1 FPS 127.1 FPS DISTANCE: 5,369,576 sm



STS98-E-5276 --- Group portrait of Shuttle & ISS crews on board ISS. Front, from the left: CDR Cockrell, EXP 1 CDR William M. (Bill) Shepherd, & Curbeam/MS. Rear, from the left: Sergei K. Krikalev/FE EXP 1. Ivins/MS. PLT Polansky. Yuri P. Gidzenko/ Soyuz CDR EXP 1, & Jones/MS.



ABOVE: STS98-E-5143 --- Inside newly opened Destiny (It to rt): Ivins/MS, CDR Cockrell & CDR EXP 1 William Shepherd

BELOW: STS098-713a-016 --- New ISS configuration as viewed from departing Atlantis.







----- CREW GREETINGS AT ELLINGTON ON RETURN HOME -----

ABOVE: PLT Polansky (left), CDR Cockrell (center), gretted by Steve Hawley/Flt Crew Ops Dir. RIGHT: JSC Center Director George W.S. Abbey also greets crew.



IN MCC: Orbit 1 FCT in Shuttle FCR. FD Robert Castle ,near center, holds crew insignia.

SIGNIFICANT ANOMALIES:
- CDR and PLT HUD runway misalignment. PLT saw about 600 foot offset to the right of the runway, CDR was about half of this offset

- PCA vent cover bolts did not fit 5/16-in socket. PCA vent bolts were difficult to start with power tool.

 EV2 EMU boot pressure point during EVA #1 and EVA #2.
 Broken connector bail linkage, one of rivets on connector bail broke.

- Sticky mini-workstations end effectors, occasionally stuck open.

SASA P4 connector O-ring loose.

- Bad video for proshare video conferencing.

- STS-98 Vent Command error for Reboost 5.

Ku-band radar Alpha gimbal angle error

FIFTH SHUTTLE CREWMEMBER REPLACEMENT
- Mark Lee was replaced by Curbeam in February 2001. (Fourth Shuttle crewmember replacement occurred on STS-85.)

OMS assist at 2:16 MET, duration 102.2 seconds - MC-4 at 40:15:41:20Z, 1:16:28:18 MET.

Docked with ISS PMA3 Node 1 Nadir Port at 40:16:50:49Z, 01:17:37:47 MET

Collision avoidance maneuver for ISS at 41:11:48:02Z, 02:12:35:00 MET Delta V +2.5 ft/sec, 186.5 by 199.4 nm - RMS grappled PMA2 on Node 1 at 41:14:12Z, 2:14:59 MET. PMA2 installed on Z1 Truss at 41:17:00Z, 2:17:47 MET.

- U.S. Laboratory grappled in PLB at 41:17:227, 218:00 MET. U.S. Lab (Destiny) was attached to Node at 41:19:00Z, 2:19:47

- EVA 1 Start at 41:15:51Z, 2:16:36 MET. EVA duration 7H33M56S.

First ISS Reboost maneuver Started at 42:17:13Z, 3:18:00 MET. Second Reboost maneuver Started at 42:18:18Z, 3:19:05 MET.

- Section Repost maneuver Started at 42:10 to 2, 3.17:00 ME Altitude increase of 3.6 nm, orbit 203.0 by 188.9. - EVA 2 Start at 43:15:58Z, 4:16:45 MET, duration 6H50M. - Third Reboost maneuver Started at 44:15:53:02Z, 5:16:40:00

MET lasted 4 hours.

Fourth Reboost Started at 44:20:06:02Z, 5:20:53:00 MET. 5 nm

- Fourth Reboost Staffed at 44:20:06:02Z, 5:20:53:00 MET. 5 altitude increase, orbit 206.5 by 193.7 nm
- EVA 3 Start at 45:14:30Z, 6:15:16:58 MET, duration 5H25M.
- Fifth Reboost at 45:23:08Z, 6:23:54:58 MET, 1.4 nm altitude increase, orbit 209 by 195 nm.

Sixth Reboost at 46:15:23Z, Delta V of 4.4 fps, orbit 209.4 by 195.5 nm.

- Seventh Reboost at 46:16:56Z, duration 3h41m, Delta V 11.9 fps, orbit 212.5 by 199.2 nm. - Hatch closed at 47:13:22Z, 8:14:08:58 MET.

- Haltch Closed at 47:13:222, 8:14:08:38 MET.
- Undocked at 47:14:06Z, 8:14:153 MET.
- Relocated PMA2 from Node 1 to fwd CBM. Delivered and installed U.S. Lab on Node 1 fwd CBM and connected umbilicals, activated U.S. Lab core systems. Activated and C/O CMG's, then handed over attitude confrol to U.S. GN&C system.
- ISS Visitor Time is 6:21:15:11.

TRANSFERS

-TO ISS: Dry cargo IVA 3036 lbs, U.S. Lab 29866 lbs, external EVA 368 lbs = total 33270 lbs. (Included H2O transfer to ISS: 10 CWC's = 993 lbs

Transfers from ISS to shuttle 872 lbs.

Rendezvous and dock with ISS at PMA3, Node 1 Nadir Port.

| | SPACE SHUTTLE WISSIONS 5 | | | | | | NO 30 | IVIIV | IARI | Fage 2-134 - 313-102/3A.1 | |
|---|--|---|--|---|---|--------------------|--------------|--|--------------|---|---|
| FLT NO. | ORBITER | CREW (10) 7 UP/7 DOWN TITLE, NAMES | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES | SSME-TL NOM-ABORT EMERG THROTTLE | SRB RSRM AND | INC | ORBIT HA/HP | FSW | PAYLOADS/ | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, |
| NO. STS-102/ ISS 5A.1 SEQ FLT # 103 KSC-103 ISS-5A.1 | OV-103 (Flight 29) Discovery OMS PODS: LPO1-32 RPO3-30 FRC3-29 | 7 UP/7 DOWN TITLE, NAMES & EVA'S CDR: James D. Wetherbee (Fit 5 - STS-32, STS-52, STS-63, STS-86) P608/R108/V80/M198 PLT: James M. Kelly P609/R263/M229 M/S 1 UP/EV3: Andrew S. W. Thomas (Fit 3 - STS-77, Up to Mir on STS-89, Down STS-91) P610/R213/V149/M186 M/S 2/EV4: Paul Richards P611/R264/M230 M/S 3 UP/EV1/EXP2 Fit Eng 1: James S. Voss (Fit 5 - STS-44, STS-53, STS-69, STS-101) P612/R136/V85/M121 M/S 4 UP/EV2/EXP2 Fit Eng 2: Susan Helms (Fit 5 - STS-54, STS-64, | | LANDING TIMES FLT DURATION, WINDS KSC 15 (KSC 54) 80:07:31:41Z 2:31:41 AM EST Wednesday 12 3/21/01 (7) DEORBIT BURN: 80:06:26:06Z XRANGE: 373 NM ORBIT DIR: AR 9 AIM PT: NOMINAL MLGTD: 2839 FT 80:07:31:41Z VEL: 199 KGS 203 KEAS HDOT: -1.0 FPS TD NORM 205: 2529 FT NLGTD: 6190 FT 80:07:31:52Z VEL: 165 KGS 159 KEAS HDOT: -6.3 FPS DRAG CHUTE | THROTTLE PROFILE ENG. S.N. 104/104/ 109% PREDICTED: 100/104.5/ 104.5/72/ 104.5 ACTUAL: 100/104.5/ 104.5/72/ 104.5 1 = 2048 (3) 2 = 2053 (3) 3 = 2045 (4) ALL BLOCK IIA ENGINES M 3 EOM: WEIGHT: 218094 LBS X CG: 1083.19 LANDING: WEIGHT: | | 51.60 (8) | DIRECT INSERTION POST OMS-2: 126/86.2 NM DEORBIT: APOGEE: 206.5 NM PERIGEE: 206 NM ENTRY VELOCITY: 25899 FPS ENTRY RANGE: 4391 NM | OI-28 (2) | PAYLOADS/ EXPERIMENTS CARGO: 37328 LBS PAYLOAD CHARGEABLE: 28739 LBS DEPLOYED: 9649 LBS NON-DEPLOYED: 3517 LBS MIDDECK: 472 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 1039900 LBS NON-DEPLOYED: 1039900 LBS CARGO TOTAL: 3191667 LBS PERFORMANCE MARGINS (LBS): FPR: 3274 LBS FUEL BIAS: 818 LBS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) Brief Mission Summary: STS-102, 8th mission to ISS, provided the first ISS crew changeout and, the first flight of the Italian-built Multipurpose Logistics Module (MPLM) named Leonardo. Among the MPLM cargo was the first scientific rack for U.S. Lab, Destiny, delivered on STS-98. With the ISS crew changeout, three crews participated in the STS-102 mission. KSC W/D: OPF 84, VAB 8, PAD 24 = 113 days total. LAUNCH POSTPONEMENTS: - Baselined launch date of 3/16/00 on 1/28/99. - Postponed launch to 4/13/00, 6/29/00, 10/19/00, 2/15/01, then 3/8/01. (Postponements caused by replacement of 9 damaged RCS thrusters, STS-98 launch postponements, and SRB x-rays/inspections and replacement of damaged cables. LAUNCH SCRUBS: None LAUNCH WINDOW: - Launch window opened at 67:11:37:10Z and closed at 67:11:47:08Z for a total window of 9MS8S. - Selected the Preferred Launch Time (In-plane time) of 67:11:42:09Z, 6:42:09 AM EST, giving a launch window of 4M59S. Note: Sunrise was 2 minutes before launch. This was a daylight launch. LAUNCH DELAYS: None - Launch occurred on time at 67:11:42:09Z, 6:42:09 AM EST on Thursday, March 8, 2001. |
| RESE | PERSONAL PROPERTY OF THE PROPE | (Fit 3 - 313-34, 313-04, STS-78, STS-78, STS-101) P613/R158/V108/F19 M/S 5 UP/EXP2 CDR: Yury Usachev (Russia) (Fit 2 - STS-101) P614/R256/V168/M223 M/S 3 DN/EXP1 Fit Eng: Sergei Krikalev (Russia) (Soyuz UP, STS-102 DN) (Fit 3 - STS-60, STS-88) P615/R177/V154/M154 M/S 4 DN/EXP1 CDR: William M. Shepard (Fit 4 - STS-27, STS-41, STS-52, Soyuz TM UP to ISS, STS-102 DN) P616/R96/V56/M87 Continued | 2 ENG TAL (BEN): 2:24 2:24 NEG RETURN: 3:51 3:55 PTA (U/S 152): 4:48 DROOP: 4:43 PTM (U/S 152): 6:02 6:01 MECO CMD: | BRK INIT: 98 KGS DRAG CHUTE JETTISON: 57 KGS 80:07:32:31Z BRK DECEL FPS ² : AVE 3.5 PK 5.4 WHEELS STOP: 80:07:33:06Z 14244 FT ROLLOUT: 11244 FT 85 SEC WINDS: 2H 9R OFFICIAL: 2309P16 KTS SS: 2H 9R PK: 4H 16R Continued | STS102-3 transport | EXP cre | ws. IS | t Shuttle fligh S is lined up Discovery. | nt to | FINAL TDDP: 2847 RECON: 3031 PAYLOADS: PLB: ISS-5A.1 MPLM PMA3 Logistics GAS (2) WSVFM ICC RMS, ODS MIDDECK: NONE 5 CRYO TK SETS 6 GN2 TANKS RMS 68 RMS used for PMA3 install on lab, MPLM grapple, deploy, retrieve, and berth, and EVA Support | TAL WX: - Zaragoza (prime) was forecast NO GO for crosswinds (observed GO at launch and TAL landing times), Moron was NO GO for ceiling and showers within 20 nm. Ben Guerir (2-engine TAL call) was GO and selected. PERFORMANCE ENHANCEMENTS: - Standard Set Plus: (1) PE OPS High Q WIN/MAR, (2) OMS assist is 3717 lbs, (3) 52 nm MECO, (4) Del Psi FLIGHT DURATION CHANGES: - Total flight duration extensions 1 day plus 1 orbit Extended 1 day for MPLM stowage exceeding planned time and 1 orbit for showers and low clouds at KSC. Plan was to land at KSC on orbit 201; however, KSC was forecast NO GO for the next 3 days. Waved-off the planned landing at KSC for orbit 201 due to weather forecast NO GO for showers and low clouds. Plan was to land at KSC on orbit 202; if not, then land at EDW on orbit 203. Minutes before Tig, the weather forecast was observed GO and forecast GO to land at KSC on orbit 202. (Observed crosswinds at landing time were 16 knots, a 4-knot violation.) Low ceiling at 4200 feet became scattered minutes before landing. SHUTTLE NIGHT LANDING #17: - Landed at KSC runway 15 on orbit 202 at 80:07:31:41Z, 2:31:41 AM EST Wednesday, March 21, 2001. Flight duration 12:19:49:32. Landed at KSC Orbit 101. Continued |

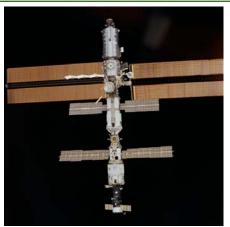
| | | | SP | ACE SHU | JTTLE | MIS | SIO | NS SU | MM | ARY | Page 2-135 - STS-102/ |
|----------------------|------------------|---|-------------------------------|--|----------------------------------|-------------|--|----------|-----|--------------------------|---|
| FLT | ORBITER | CREW (10) 7 UP/7 DOWN | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-102/ ISS 5A.1 | | Continued M/S 5 DN/EXP1 Soyuz PLT: Yuri Gidzenko | Continued OMS-2: | Continued DENS ALT: 264 FT | | | The state of the s | | | | Continued FIRSTS/LASTS: - First shuttle flight transporting an Expedition crew - Expe |
| Continued | | (Russia) (Soyuz Up, STS-102 DN) P617/R265/M231 | 38:35 38:37 | 264 FT FLT DURATION: 12:19:49:32 S/T: 906:23:28:05 | | | HATCH | EXIT SEE | | 000 | FIRS 15/LASTS: -First shuttle flight transporting an Expedition crew - Expeup, Expedition 1 down. Expedition 1 Crew launched on F Russian Soyuz rocket from Baikonur Cosmodrome, Kaza on October 31, 2000 at 2:53 AM EST (305:07:53Z). Soyu docked with ISS on 11/2/2000 at 4:21 AM EST (307:09:2 Expedition 1 Crew: CDR - William Shepherd, Soyuz pilot Gidzenko, Flight Engineer - Sergei Krikalev. - Sheperd flight time 80:07:31:41 |
| гидзенко к ѕнерні | EPUKAJÎÊB ERD | EMU/TETHERED EVA #54 SCHEDULED EVA #55 DURATION 8:56 SS EVA #62 EMU/TETHERED | | OV-103: 230:01:27:50 DISTANCE: 5,357,432 sm | | | | | | | EVENTS: - TI maneuver at 69:03:12:39Z, 1:15:30:30 MET, orbit 199: 205.3. MC-4 at 69:04:33:21Z, 1:16:51:12 MET, orbit 199. 206.1 nm ISS capture at 69:06:38:26Z, 1:18:56:17 MET; Docked at Lab Forward Port at 69:06:58:23Z: hatch opened at |
| | | EVA #55 SCHEDULED EVA | | | PER | 13 | | 9 | | | - EVA 1 Start at 2:17:29 MET and End at 3:02:25 MET, di 8:56. |

STS102-319-028 --- STS-102, EXP 1, & EXP 2 crews in Destiny. Front (I to r): Gidzenko/RSA, Krikalev/RSA, Shepherd, Helms, Usachev/RSA & Voss. Rear (I to r): Kelly, Richards, Wetherbee & Thomas.

PLNG/O3 - R. E. Castle docking to ISS Unity Node.



STS102-712-005 --- Backdropped against the blackness of space, the ISS as viewed after Shuttle separation.



on crew - Expedition 2 aunched on Flight 2R, odrome. Kazakhstan 7:53Z). Soyuz ST (307:09:21Z). d, Soyuz pilot - Ýuri

MET, orbit 199.2 by MET, orbit 199.1 by

IET; Docked at PMA2 pened at ______.
02:25 MET, duration

- PMA3 grappled, unberthed, and installed on Node 1 Port ACBM at 70:13:50Z.

- MPLM grapple at 71:03:36Z, 3:15:54 MET, and installed on Node 1 Nadir ACBM at 71:06:08Z, 3:18:46 MET. - EVA 2 Start at 4:17:45 MET and End 5:00:06 MET, duration

- Collision avoidance maneuver/ISS Reboost #1 at 73:12:12:09Z, 6:02:30:00 MET, duration 47M22S, orbit 200.1 by 210.8 nm, Delta V 11.8 fps. - ISS Reboost #2 at 75:11:32:23Z, 7:23:50:14 MET, 7.2 fps, orbit

203 by 212 nm.

- ISS Reboost #3 at 76:09:17:45Z, 8:22:33:52 MET, 7.4 fps, orbit 204.5 by 213.7 nm.

- MPLM grappled at 9:20:22 MET, reberthed in orbiter, and ungrappled at 10:00:05 MET - ODS hatch was closed at 78:02:48Z, 10:15:06 MET.

- ODS natch was closed at 78:02:482, 10:15:06 MET.
- Undocked at 78:04:31:53Z, 10:16:50 MET.
- Transfers: Shuttle to ISS: 9649 lbs cargo plus 980 lbs water in 10 CWC's. ISS to Shuttle: 1647 lbs cargo.
- Crew rotation (Expedition 1 to Expedition 2). Relocated PMA3 from Node 1 Nadir to Node 1 Port. Berthed MPLM to Node 1 Nadir. Transferred RSP's, RSR's, HRF, ISPR, etc. to ISS.

- Krikalev flew two long-duration missions to Mir.

ISS Visitor Time is 8:21:33:30

RENDEZVOUS #52:
- Rendezvous and dock with ISS at PMA2 Lab Forward Port.

SIGNIFICANT ANOMALIES: - Flash evaporator left topping Evaporator Duct Heater String A

- WCS Fan Sep Rotary Switch 2 position failure - Freon® loop flow degradation

- Freom toop now degradation
- EV1 burning sensation in eyes during Airlock depress
- PMA3 J603 loose O-ring EVA
- Unable to remove PMA3 P608 connector cap
- TCS failure during rendezvous termination operation
- OCAC fan failure (running slow at all speed settings)
- Right OMS Vapor Isolation Valve #2 anomaly

- C&W limits set volts pushbutton rotary switch down position not working on panel R13U

JSC2000-E-06202 --- At their MOCR console, Flight Directors Wayne Hale (left) and John Shannon discuss a mission detail.

DURATION 8:21

MCC WHITE FCR (33)

FLIGHT DIRECTORS: A/E - N. W. Hale

LD/O1 - L.P. Shannon 02 - P. S. Hill PLNG/03 - P. F. Dye

LD/O1 - R. E. LaBrode O2 - S. P. Davis

MOD - J. W. Bantle

STATION:



STS102-312-004 --- During EVA 1 Voss (and Helms – out of frame) prepared for MPLM

| | | CREW | LAUNCH SITE. | LANDING SITE/ RUNWAY. | SSME-TL NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
|-----------------------|--|---|--|---|--|-------------------|-------|------------------------|--------|---------------------------------------|---|
| FLT | ORBITER | (7) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | URBIT | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-100/ | OV-105 | CDR: | KSC PAD 39A | WINDS EDW 22, CONC | ENG. S.N. 104/104/ | BI-107 | 51.60 | DIRECT | OI-28 | CARGO: | Brief Mission Summary: STS-100/6A, 9th mission to ISS, |
| ISS 6A | (Flight 16) | Kent V. Rominger | 109:18:40:41:99Z | EDW 48, CONC 29 | 109% | | (9) | INSERTION | (3) | 38330 LBS | delivered and installed the ISS Canadarm2 robotic arm. The |
| | Endeavor | (Flt 5 - STS-73, STS-80, STS-85, STS-96) | 2:40:42 PM EDT (P) 2:40:42 PM EDT (A) | 121:16:10:43Z 9:10:43 AM PDT | PREDICTED: | RSRM 79 | | POST OMS-2: | | <u>PAYLOAD</u> | first job for the arm was to attach a new airlock on ISS, to be |
| SEQ FLT # 104 | | P618/R200/V131/M174 | Thursday 32 | | 100/104.5/ | FT 400 | | 178.7 X 85.7 | | CHARGEABLE: | delivered on the next flight, STS-104. In addition, the second MLPM, Raffaelo, flown on this flight, transferred needed |
| | OMS PODS: | PLT: | 4/19/01 (14) | Tuesday 18 5/1/01 (10) | 104.5/72/ 104.5 | ET-108 | | NM | | 29472 LBS | cargo to ISS and returned items from ISS to Earth. |
| KSC-104 | LPO4-23 | Jeffrey S. Ashby (Flt 2 - STS-93) | LAUNCH WINDOW: | | | SLWT-13 | | | | DEPLOYED: | VCC W/D. ODE 03 VAD F DAD 33 110 doug total |
| <u>PAD:</u> 39A-59 | RPO1-30 FRC5-16 | (Fit 2 - STS-93) P619/R251/V169/M218 | 4M49S BASED ON IN-PLANE TIME | <u>DEORBIT BURN:</u> 121:15:02:47Z | ACTUAL: 100/104.5/ | | | | | 6346 LBS | KSC W/D: OPF 82, VAB 5, PAD 23 = 110 days total. |
| 39A-59 | | | (PLT) | XRANGE: 527 NM | 104.5/72/ | | | | | NON-DEPLOYED: | LAUNCH POSTPONEMENTS: |
| ISS-6A | | M/S 1/EV1: Chris A. Hadfield | EOM PLS: KSC | ORBIT DIR: AL 28 | 104.5 | | | | | 4282 LBS | - Baselined launch date of 12/2/99 - Postponed launch to 4/20/00, then 7/13/00, 7/27/00, 11/30/00. |
| MLP-1 | | (Flt 2 - STS-74) | TAI: 77A | | 1 = 2054 (3) | BRKUP: | | DEORBIT: | | MIDDECK: | - Postponed launch to 4/19/01 on 2/24/00. |
| | | P620/R202/V170/M178 | TAL WX: MRN, BEN | | 2 = 2043 (6) 3 = 2049 (5) | 283 K | | APOGEE 219 NM | | 781 LBS | LAUNCH SCRUBS: None |
| NINTH SHUTTLE | | <u>M/S 2</u> : | SELECTED: | MLGTD: 2159 FT 121:16:10:43Z | . , | <u>ET</u> | | PERIGEE | | SHUTTLE | |
| FLIGHT TO | | John L. Phillips CSA/Canada | RTLS: KSC 33/N/N TAL: MRN 20/N/N | VEL: 207 KGS | ALL BLOCK IIA ENGINES | IMPACT 1:26:38 | | 204 NM | | ACCUMULATED WEIGHTS: | LAUNCH WINDOW: - Launch window opened at 109:18:36:12Z and closed at |
| ISS | | P621/R266/M232 | AOA: KSC 33/N/N | 195 KEAS HDOT: -3.6 FPS | | MET | | ENTRY | | DEPLOYED: | 109:45:31Z, giving a total window of 9M29S. The Preferred |
| | | M/S 3/EV2: | PLS: KSC 15/N/N | TD NORM 195: | M 3 EOM: WEIGHT: | LAT: | | VELOCITY: 25919 FPS | | 1046246 LBS NON-DEPLOYED: | Launch Time (PLT) was 109:18:40:42 (In-plane time) 2:40:42 PM EDT, giving a launch window of 4M49S. |
| | | Scott E. Parazynski | TDEL: | 2148 FT | 220693 LBS | 1.23°S | | | | 1499587 LBS | 7.3 |
| | | (Flt 4 - STS-66, STS-86, STS-95) | 0.10 -0.018/0.02 | NLGTD: 5410 FT | X CG: 1083.79 | LONG: | | ENTRY RANGE: | | CARGO TOTAL: 3229997 LBS | LAUNCH DELAYS: None - Launch occurred on time at 109:18:40:42Z, 2:40:42 PM EDT on |
| | | P622/R187/V144/M165 | MAX Q NAV: | 121:16:10:53Z VEL: 157 KGS | | 127.14°W | | 4387 NM | | | Thursday, April 19, 2001. |
| ROMINGER | ASHBY A | M/S 4: | 725 728 | 149 KEAS | <u>Landing</u> : Weight: | | | | | PERFORMANCE MARGINS (LBS): | TAL WX: |
| 3 \= | | Umberto Guidoni | SRB STG: | HDOT: -5.2 FPS | 220556 LBS | | | | | FPR: 3274 | - Zaragoza (prime) was NO GO for head wind violations until |
| i i | N. S. S. | (Flt 2 - STS-75) (ESA-Italy) | 2:03.7 2:04 | DRAG CHUTE DEPLOY: 191 KEAS | X CG: 1085 49 | | | | | FUEL BIAS: 818 FINAL TDDP: 2670 | approximately L-3 minutes when head winds dropped to 25 knots. Moron (selected early) was GO and decision made to stay with a |
| 64 | 100 | P623/R212/V171/M185 | PERF: NOMINAL | 121:16:10:45Z | 1003.47 | | | | | RECON: 2296 | solid Moron. Ben Guerir was NO GO for forecast and observed |
| 3 | * | M/S 5: | 2 ENG TAL (MRN): | BRK INIT: 106 KGS | | | | | | PAYLOADS: | showers/virga. |
| OHVAKOB GUI | DONI HADFREL | Yuri V. Lonchokov | 2:33 2:33 | DRAG CHUTE | | | | | | PLB: | PERFORMANCE ENHANCEMENTS: |
| | | (Russia) P624/R267/M233 | NEG RETURN: | <u>JETTISON</u> : 53 KGS 121:16:11:16Z | | | 17182 | | | ISS-6A ICBC3D | - Standard Set Plus: (1) PE Operational High Q TRN/APR, (2) OMS assist is 4000 lbs, (3) 52 nm MECO, (4) Del Psi |
| | | 1 024/11/20///11/200 | 3:54 3:55 | BRK DECEL FPS ² : | | | N. | | 1 | MPLM | |
| | | | PTA (U/S 243): | AVE 6.5 PK 10.6 | 400 | | 4 | 1 | | SLP-06A RMS, ODS | FLIGHT DURATION CHANGES: - Total ext 1 day + 2 orbits. Planned landing was on orbit 170. |
| NEW ISS | -6A+STS-100 | | 4:47 4:46 | WHEELS STOP: | 1 | | | | | ., . | - Extended 1 docked day due to ISS C&C MDM (computer) |
| | The state of the s | | PTM (U/S 243): | 121:16:11:34Z 10123 FT | and the | | | | | MIDDECK: DTO | problems resulting in a planned landing on orbit 185. Did not close PLBD's and waved-off landing at KSC on orbits 185 and |
| | POBOTICS | 3)) | 5:56 5:50 | | 1 | 1 | | | A 30.1 | EMU H/W | 186 due to forecast of showers, crosswinds, and low ceiling |
| | SCIENCE LOGISTICS | | SE TAL (ZZA): | ROLLOUT: 7964 FT | No. | 1.10 | | | | EVA Tools | weather violations. Similar weather violations were forecast for KSC for the next 2 days. EDW had been called up for EOM |
| | LOGISTICS | | 6:04 6:03 | 51 SEC | The state of the s | A CO | | | | 5 CRYO TK SETS | because KSC WX violations were forecast to continue through |
| | | | SE PTM (U/S 701): | WINDS: 2H 3R | | | | | | 7 GN2 TANKS RMS 61 | the majority of the week. Decision was made to land at EDW on orbit 187. KSC WX was observed NO GO on the two extension |
| | | | 6:53 6:53 | OFFICIAL: | | | | 1 | 1 | | days. Weather observations forecast KSC was NO GO for all 3 |
| | | | MECO CMD: | 28006P10 SS: 5H 4R | 155302EM28 29010A21 (32EA | | | | | RMS used to grapple, deploy, | days. EDW was GO on EOM+1. Landed on EDW runway 22 on orbit 187 at 121:16:10:43Z, 8:10:43 AM PST on May 1, 2001, |
| | | | 8:24.2 8:25.4 | PK: 8H 7R | | | |)1) Endeavo | | retrieve, and berth | 11:21:30:01 MET. |
| | | Continued | Continued | | approachin | | | adarm2 on bo | ard, | Spacelab Pallet and MPLM, and for EVA | |
| | | | 2 3.1 | Continued | | 3.22.31 | | | | Support | Continued |
| | | | | | | | | | | | |

| | | | SP | ACE SHU | JTTLE | MIS | SIO | NS SU | MM | ARY | Page 2-137 - STS-100/6A |
|------------------|---------|--|---|--|---|-----------------------------------|-----------------------------|--|-----------------------------------|----------------------------------|---|
| FLT NO. | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES | SSME-TL NOM-ABORT EMERG THROTTLE | SRB RSRM AND | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, |
| STS-100/ | | & EVA'S Continued | ABORT TIMES Continued | FLT DURATION, WINDS Continued | PROFILE ENG. S.N. | ET | | OVHD (| 110 | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) Continued |
| ISS 6A Continued | | SS EVA #63 EMU/TETHERED EVA #56 SCHEDULED EVA #57 DURATION 7:09:51 SS EVA #64 EMU/TETHEREDEVA #57 SCHEDULED EVA #58 DURATION 7:39:23 MCC WHITE FCR (34) FLIGHT DIRECTORS: A/E - L. E. Cain LD/O 1 - P. L. Engelauf O 2 - K. B. Beck PLNG/O3 - B. P. Austin MOD - J. M. Heflin STATION: LD/O 1 - J. M. Curry O 2 - M. J. Ferring PL NG/O 3 - R. F. Castle | VI: 25930 25920 OMS-2: 43:40 43:42 | DENS ALT: 3925 FT FLT DURATION: 11:21:30:01 S/T: 918:20:58:06 OV-105: 167:03:14:03 DISTANCE: 4,910,188 sm | portrait in Guidoni/Es row: Jame | Destiny. SA-Italy, s S. Vos | Bottom Roming ss/EXP2 | and EXP a, from left: Had ger, Susan J. H y Yury V. Usad azynski, Philli | 2 crews dfield/Cdelms/Echev/EX | SA, EXP2. Middle (P2, & | EVENTS: - MC-4 (RCS) at 1:18:00:36 MET, orbit 199.1 by 206.1 nm - Docked at ISS PMA2 Lab Forward Port at 111:14:10:42Z - EVA 1 Start at 2:17:04:41 MET, duration 7:09:51 - RMS grappled the Spacelab Pallet, unberthed from orbiter, and installed on Lab Cradle Assembly at 2:16:07:18 MET - ISS hatch opening and crew ingress into ISS at approximately 3:14:40 MET MPLM in PLB at 3:19:45 MET grappled and positioned over Node 1 Nadir CBM and installed at 3:21:04 MET First ISS Reboost maneuver Started at 4:01:09:54 MET, duration 59M36S, Delta V 7.41 fps, orbit 205.5 by 212.2, raised orbit 2.1 nm EVA 2 Start at 4:17:53:12 MET, duration 7h39M22S - Second ISS Reboost maneuver Started at 7:16:40:00 MET (RCS), ended at 1 hour, Delta V was 15.9 fps, orbit 210 by 206 RMS berthed MPLM in PLB and powered down at 8:02:43 MET SRMS to RMS handoff of SLP berthed at 9:02:02 MET Delivered and installed SSRMS and connected cables to U.S. Lab. UHF antenna on U.S. Lab, removed starboard ECOMM antenna. Delivered and installed express racks with payloads. Replaced failed CMC MDM #1 Undocked at 119:17:34:04Z (Extended flight 1 docked day due to ISS C&C MDM and Node MDM problems) |



JSC2001-E-12120 -- Ascent Flight Director LeRoy Cain (left) discusses mission with FD Jeffrey Bantle in the MOCR.



STS100-E-5238 (22 April 2001) --- Hadfield/MS representing CSA, stands on one Canadian-built robot arm (RMS) to work with another one, called Canadarm2, for ISS.



STS100-E-5958 -- ISS, sporting a readily visible new addition in the form of the Canadarm2 robotic arm, as seen from Shuttle post separation.

to ISS C&C MDM and Node MDM problems).
- Transferred 6346 lbs cargo to ISS and 1608 lbs from ISS to Shuttle. Transferred 1380 lbs water in 14 CWC's.
- ISS Visitor time is 8:03:23:22.

RENDEZVOUS #53: - Rendezvous and dock with ISS at PMA2 Lab Forward Port

SIGNIFICANT ANOMALIES: - FES Feedline B Mid 2 Htr 1 failed off

- RMS End Effector Capture Switch sticky

- WSB 3 anomalous temperature response when operating on WSB 3B controller

- Humidity Separator B water carryover
- RCS Jet R5D low chamber pressure
- EV1 eye irritation during EVA 1 and EVA 2 (Disposable in-suit drink bag leaked)

drink bag leaked)
- ISS Early Comm Antenna connector fell apart
- Video Signal Converter failed to release from SLP during EVA 2
- SIGI data check bad status indications
- SRB - Unburned propellant (3 percent) in RH Forward Booster
Separation Motor (BSM). Conclusion is water intrusion.
- LOMS POD inboard Y-web dithering/erratic System A Heater
- In video of launch, the lower left hand OMS Pod TPS appeared
to be flexing during SSME startup. Similar but smaller motion has
been seen on the pods in the past been seen on the pods in the past.

| | | | 3 P | ACE SHU | 310 | INO OU | IVIIV | IAKT | ŭ | | |
|---|---|--|--|--|---|--|--|--|--------------|---|---|
| FLT | ORBITER | CREW (5) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-104/ ISS 7A SEQ FLT #105 KSC-105 PAD 39B-46 MLP-2 TENTH SHUTTLE FLIGHT TO ISS | OV-104 (Flight 24) Atlantis OMS PODS: LPO3-28 RPO4-24 FRC4-24 | CDR: Steven W. Lindsey (Fit 3 - STS-87, STS-95) P625/R229/V131/M200 PLT: Charles O. Hobaugh P626/R268/M234 M/S 1/EV1: Michael L. Gernhardt (Fit 4 - STS-69, STS 83, STS-94) P627/R198/V138/M173 M/S 2: Janet L. Kavandi (Fit 3 - STS-91, STS-99) P628/R243/V158/F32 M/S 3/EV2: James F. Reilly (Fit 2 - STS-89) P629/R234/V172/M204 SS EVA #65 EMU/TETHERED EVA #58 SCHEDULED EVA #59 DURATION 5:59 | KSC 39B 193:09:03:59Z 5:03:59 AM EDT (P) 5:03:59 AM EDT (A) Thursday 33 7/12/01 (7) LAUNCH WINDOW: 7M57S USING PLT (IN-PLANE TIME) EOM PLS: KSC TAL: ZZA TAL WX: MRN SELECTED: RTLS: KSC 33 N/N TAL: ZZA 30 N/SF AOA: KSC 15 N/N PLS: EDW 22 N/N TDEL: 0.01 0.012/0.05 MAX Q NAV: 732 732 SRB STG: 2:02.1 2:02 PERF: NOMINAL | KSC 15 (KSC 55) 206:03:38:55Z 11:38:55 PM EDT Tuesday 19 7/24/01 (10) DEORBIT BURN: 206:02:31:35Z XRANGE: 391 NM ORBIT DIR: AL 29 AIM PT: NOMINAL MLGTD: 2183 FT 206:03:38:55Z VEL: 198 KGS 199 KEAS HDOT: -1.4 FPS TD NORM 195: 2499 FT NLGTD: 5442 FT 206:03:39:06Z VEL: 148 KGS 148 KEAS HDOT: -5.7 FPS DRAG CHUTE DEPLOY: 191 KEAS 206:03:38:58Z BRK INIT: 56 KGS | 104/104/ 109% PREDICTED: 100/104.5/ 104.5/72/ 104.5 ACTUAL: 100/104.5/ 104.5/72/ 104.5 1 = 2056 (1) 2 = 2051 (2) 3 = 2047 (6) ENG 1 & 3 BLOCK IIA ENG 2 BLK II M 3 EOM: WEIGHT: 209142 LBS X CG: 1083.81 LANDING: WEIGHT: | BI-108 RSRM 80 ET-109 SLWT 14 ET RPT: 283 K ET IMPACT 1:14:17 MET LAT: 36.32 °S LONG: 158.55°W | (10) | DIRECT INSERTION POST OMS-2: 127 X 85 NM DEORBIT: APOGEE: 211.0 NM PERIGEE: 207.5 NM VELOCITY: 25905 FPS ENTRY RANGE: 4405 NM | OI-28 (4) | CARGO: 35135 LBS PAYLOAD CHARGEABLE: 26424 LBS DEPLOYED: 19792 LBS NON-DEPLOYED: 6060 LBS MIDDECK: 582 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 1066028 LBS NON-DEPLOYED: 1506229 LBS CARGO TOTAL: 3265132 LBS PERFORMANCE MARGINS (LBS): FPR: 3274 FUEL BIAS: 818 FINAL TDDP: 2884 RECON: 2990 | Brief Mission Summary: STS-104, 10th mission to ISS, delivered, installed, and operated the first ISS airlock, Quest – "Giving ISS a Doorway to Space". Quest provided the capability for conducting EVA's without the presence of Shuttle, for EVA's using either Russian Orlan or U.S spacesuits, and for a new pre-breathing protocol to prevent "the bends". Also, this was first mission support from Houston's ISS Flight Control Room (BFCR). KSC W/D: OPF 82, VAB 11, PAD 21 = 114 days total. LAUNCH POSTPONEMENTS: - Baselined launch date of 8/24/00 on 7/29/99 - Postponed launch date to 2/8/01 on 11/10/99 - Postponed launch date to 5/15/01 on 2/24/01 - Postponed launch date to 7/12/01 LAUNCH SCRUBS: NONE LAUNCH WINDOW: - Launch window opened at 193:08:59:00Z and closed at 193:09:11:56Z in two panes with a 10 second cutout between panes, resulting in a total window of 12M56S. The Preferred Launch Time was 193:09:03:59Z (Pane 1 In-Plane Time) resulting in a launch window of 7M57S. LAUNCH DELAYS: NONE - Launch occurred On-Time at 193:09:03:59Z (5:03:59 AM EDT) on Thursday, July 12, 2001. TAL WX: - Zaragoza (Prime and Selected) forecast and observed GO, Moron (2-Eng TAL Call) was forecast and observed GO. |
| N-SS AIRE | OCK OCK | SS EVA #66 EMU/TETHERED EVA #59 SCHEDULED EVA #60 DURATION 6:29:20 SS EVA #67 DOCKED EVA 1 FROM QUEST A/L #1 EMU/TETHERED EVA #60 SCHEDULED EVA #61 DURATION 4:01:30 MCC WHITE FCR (35) FLIGHT DIRECTORS: A/E/O 2 - N. W. Hale LD/O 1 - P. S.Hill PLNG/O3 - J. P. Shannon ISS LD/O 2 - M. A. Kirsich ISS O 1 - S. P. Davis ISS PLNG/O3 - J. M. Hanley MOD - R. E. Castle | 2 ENG TAL (MRN): 2:23 2:26 NEG RETURN: 3:54 3:57 PTA (U/S 159): 4:39 4:36 SE OPS 3: 5:20 NC PTM (U/S 159): 6:02 6:02 SE TAL (ZZA): 6:03 6:06 SE PTM (U/S 755): 6:49 6:52 Continued | DRAG CHUTE JETTISON: 57 KGS 206:03:39:39Z BRK DECEL (FPS): AVE 1.6 PK 5.1 WHEELS STOP: 206:03:40:06Z 13041 FT ROLLOUT: 10858 FT 68 SEC WINDS: 4H 1L OFFICIAL: 13005P07 SS: 5H 2L PK: 6H 3L Continued | pose in nev Hobaugh. 2 Lindsey, CI Gernhardt/I | v Quest ai 2nd row, f DR/EXP2 MS. In rea | irlock: I rom le Yury V ir: Kav | M4 & EXP2 creveront: PLT Ift: Really/MS, Candi/MS, Jame J. Helms EXP2 | CDR es S. | PAYLOADS: PLB: ISS-7A ISS Airlock Spacehab Double Pallet (02 and N2 TKS) ICBC3D RMS, ODS MIDDECK: ICBC SPT EQUIP, EMU H/W, EVA TOOLS 5 CRYO TK SETS 7 GH2 TKS RMS 62 RMS used to view A/L Installation, OSVS, and EVA Support | Moron (2-Eng TAL Call) was forecast and observed GO. Ben Guerir was not available due to security concerns (BEN was forecast and observed GO). PERFORMANCE ENHANCEMENTS: - Standard Set Plus: PE Operational High Q SUM/JUL, 52 nm MECO, and Del Psi SHUTTLE NIGHT LAUNCH #26 SHUTTLE NIGHT LANDING #18 - Landed on orbit 201 on KSC runway 15 at 206:03:38:55Z, 11:38:55 PM EDT on 7/24/2001. FLIGHT DURATION CHANGES: - Total extension 2 days. One day for ISS Ops and one day for weather at KSC Extended Flight 1 day due to delays in completing ISS activities primarily caused by airlock leaks Closed PLBD's and fluid loaded crew for planned landing on orbit 186 at KSC at 11:19:32:47 MET. At Tig -10 mins, waved-off when small cluster of showers formed SW of SLF with forecast to be within 30 nm at landing. At Tig -11 mins, waved-off landing on orbit 187 at KSC with observed precipitation and low ceiling within 30 nm and forecast precipitation within 30 nm at landing time. |

| FLT | ORBITER | CREW (5) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|----------|-----------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-104/ | Continued | | Continued | | | | | 97105 | | Continued | |

ISS 7A Continued

1st Flight Blk II SSME (P&W HPFTP) Courtesy: Dan Hausman/P&W/Rocketdyne/

MECO CMD 8:23.8 8:26 25824 25823

38:33

96.6 FPS

38:29

96.7 FPS

Photo at right: JSC2001-E-21323 -- During Pre-launch in MCC (It to rt) Robert Gest /USA : Steven Hawley, Dep. Dir. FCOD; Lee Briscoe, Ch. Eng. MOD; & Milt Heflin, Ch. Flt Director's Office.

Continued...

DENS ALT: 1346 FT

FLT DURATION: 12:18:34:56

S/T: 931:15:33:02

<u>OV-104:</u> 198:05:45:31

DISTANCE: 5.309.429 sm



JSC2001-01944 (June 2001) --- First mission from ISS MCC: Members of Orbit 2 team pose for group portrait in the ISS flight control room (BFCR) in Houston's MCC. Orbit 2 Flight Director Mark Kirasich (blue shirt) stands near front at frame center. Lisa Holmesly, lead operations planner for ISS, is standing in front of Kirasich between the two logos.

Photo at Right: STS104-E-5237 --- Astronaut James F. Reilly participates in a bit of space history as he joins astronaut Michael L. Gernhardt (out of frame) in utilizing the new Quest airlock for the first ever space walk to egress from ISS.





SIGNIFICANT ANOMALIES:

- Water Loop 1 floodlight coldplate low temperature FES Feedline A heater failure
- EMU 3 battery electrolyte leakage EV1 right foot discomfort
- Airlock Handhold 0535 installation failure
- Non-tending retractable tether
- Proshare video conferencing anomaly
- Failed hand held microphone.
- Sequential Still Video (SSV) not operating
- Ku-Band failed to detect and track Ku forward signal.
- ODS C/L Camera misalignment
- Left Vent doors 8 and 9 Open 2 sticky microswitch

FLIGHT DURATION CHANGES:

- Second Extension Day. Called up EDW for EOM+1. Landed on first KSC opportunity on orbit 201 on runway KSC 15 at 206:03:38:55Z, 12:18:34:56 MET, 11:38:55 PM EDT (Tuesday, July 24, 2001 EDT).

- First flight of SSME with alternate Pratt & Whitney HPFTP
- First light of SSME with alternate Praft & Whitney HPFTP (S/N 2051) Block II engine
 First operational use of SSRMS since delivery on STS-100/6A.
 Used to grapple Airlock and install on Node 1 Starboard Port.
 First use of exercise pre-breathe of pure oxygen to purge nitrogen from EVA crew for EVA 3 (12 minute pre-breathe).
 First use of ISS Joint Airlock for EVA (by Shuttle Crew on EVA

- Docked at ISS PMA2 Lab Fwd Port. ISS contact at 1:18:04:02 MET. 195:03:08:01Z: Docking complete at 1:18:19:16 MET. 195:03:23:15Z.
- ISS Hatch open (first) 1:20:24 MET, 195:05:28Z.
- Airlock grapple. EVA 1 started at 2:18:07 MET, 196:03:12Z; ended at 3:00:06 MET. 196:09:11Z. duration 5H59M.
- ISS Reboost 1 maneuver started at 196:01:18:06Z, 3:16:14:07 MET, Delta V=6.8 ft/sec, altitude increase 2.3 nm, altitude 206 by
- EVA 2 started at 199:03:05Z; ended at 199:09:34Z, duration 6H29M20S.
- ISS Reboost 2 maneuver started at 199:09:59:12Z, 6:00:55:13 MET, delta V=6.9 ft/sec, altitude increase 2.0 nm, altitude 207.8
- -ISS Reboost 3 maneuver started at 200:07:35:04Z, 6:22:31:05 MET, delta V=14.9 ft/sec, altitude increase 4.3 nm, altitude 211.1 by 208.6 nm.
- Joy 208.6 nm.
 EVA 3 started by 202:08:35Z, and ended at 202:08:37Z, duration 4H01M30S. EVA from Joint Airlock.
 Delivered and installed ISS Joint Airlock on Node 1 Stbd port using SSRMS. Delivered and installed four HPGT's (two O2 and two H2) on Airlock. End of ISS Phase 2.
 ISS Hatch close (Final) at 9:17:51 MET, 203:02:55Z.
 Undocked at 9:19:50:00 MET, 203:04:53:59 Z.

- Transfers: Shuttle to ISS: 19782 lbs cargo (includes Airlock, 13299 lbs) plus 897 lbm water in 9 CWC's. ISS to Shuttle: 626 lbs.
- ISS Visitor Time is 8:01:45:58.

RENDEZVOUS #54:

- Rendezvous and dock with PMA2 Lab Forward Port

| | | | | LANDING SITE/ | SSME-TL | | | | | | |
|-----------------|-------------|--|-------------------------------------|-------------------------------|------------------------------|--|---------------------|--|-------|--|--|
| | | CREW | LAUNCH SITE. | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (7 UP/7 DOWN) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | ORDIT | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | ORDITER | | LANDING SITES. | LANDING TIMES | THROTTLE | AND | INC | HA/HP | 1300 | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS. |
| NO. | | TITLE, NAMES | ABORT TIMES | FLT DURATION. | PROFILE | ET | IIVC | 11/7/111 | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | & EVA'S | ADORT TIMES | WINDS | ENG. S.N. | LI | | | | LAI LINIWLINIS | TIKOTO, SIGNII IOANT ANOMALIES, ETC.) |
| STS-105/ | OV-103 | CDR: | KSC 39A | KSC 15 (KSC 56) | 104/104/ | BI-109 | 51.60 | DIRECT | OI-28 | CARGO: | Brief Mission Summary: The STS-105/7A. 1 (11th ISS mission) |
| ISS 7A.1 | (Flight 30 | Scott J. Horowitz | 222:21:10:14Z | 234:18:22:59Z | 109% | | (11) | INSERTION | (5) | 33107 LBS | provided a new crew to the ISS, transfer of supplies and |
| 133 /A.1 | | (Flt 4 - STS-75, STS-82, | 5:10:14 PM EDT (P) | 2:22:59 PM EDT | | RSRM | . , | | ` ' | | equipment via the second flight of the Leonardo MPLM. This |
| SEQ | (Discovery) | STS-101) | 5:10:14 PM EDT (A) | W 40 | PREDICTED: | 81 | | POST OMS-2: | | PAYLOAD | flight completed the first round trip for Expedition rotation |
| FLT #106 | OMS PODS: | P630/R210/V135/M183 | Friday 23 8/10/01 (7) | Wednesday 13 8/22/01 (6) | 100/104.5/ 104.5/72/ | ET-110 | | 125.9 X 84.8 NM | | CHARGEABLE: 29305 LBS | crews (EXP 2). |
| | LPO1-33 | PLT: | 0/10/01 (/) | 0/22/01 (0) | 104.5/72/ | L1-110 | | INIVI | | 29303 LD3 | (· · -)· |
| KSC-106 | RPO3-31 | Frederick W. Sturckow | LAUNCH WINDOW: | DEORBIT BURN: | 10110 | SLWT | | | | DEPLOYED: | KSC W/D: OPF 79, VAB 8, PAD 31 = 118 days total. |
| ΡΔΠ | FRC3-30 | (Flt 2 - STS-88) | 9M58S ISS WINDOW | 234:17:15:23Z | ACTUAL: | 15 | | | | 9657 LBS | LAUNCH POSTPONEMENTS: |
| PAD 39A-60 | | P631/R247/V173/M215 | OPEN | XRANGE: 793 NM | 100/104.5/ | | | | | NON DEDLOVED | LAUNCH POSTPONEMENTS: - Baselined launch date of 6/21/01 on 6/22/00 |
| | | M/S 1/EV2: | EOM PLS: KSC | | 104.5/72/ 104.5 | | | | | NON-DEPLOYED: 4654 LBS | - Postponed launch date to 7/12/01 - Postponed launch date to NET 8/5/01 on 6/7/01 |
| MLP-3 | | Patrick G. Forrester | TAL: ZZA | ORBIT DIR: AR 10 | 104.5 | | | | | | I- Postponed launch date to NET 8/9/01 on 7/11/01 |
| ELEVENTH | | P632/R269/M235 | TAL WX: MRN, BEN | AIM PT: NOMINAL | 1 = 2052 (4) | | | | | MIDDECK: | LAUNOU CODUDO |
| SHUTTLE | | | | MLGTD: 1508 FT | 2 = 2044 (6) 3 = 2045 (6) | | | | | 475 LBS | - Scrubbed the 8/9/01 launch attempt. The launch window was in |
| FLIGHT TO | | M/S 2/EV1: | SELECTED: | 234:18:22:59Z | 3 = 2045 (6) | | | | | CULUTTU E | two planes; however, at the L-2 day MMT, it was decided not to |
| ISS | | Daniel T. Barry (Flt 3 - STS-72, STS-96 | RTLS: KSC 15 N/N TAL: MRN 20 N/N | VEL: 210 KGS | | | | | | SHUTTLE ACCUMULATED | use Plane 2 for the first launch attempt on Thursday, August 9, |
| | | P633/R209/V155/M182 | AOA: KSC 15 N/N | 202 KEAS HDOT: -3.2 FPS | ALL | OTO405 5 | 5007 | (4.0. 1 | 24) | WEIGHTS: | 221:21:42:46Z or 9M59S total window. With a Preferred Launch |
| | | | PLS: EDW 22 N/N | ПРОТ3.2 ГРЗ | DI OCK IIV | | | (12 August 200 | | DEPLOYED: | Time (PLT) of 221:21:37:46Z, the launch window was 5M00S. |
| | | M/S 3 UP/EXP 3 CDR: | | TD NORM 195: | DODIVIL O | | ib view | of Shuttle/ISS | | 1075685 LBS | LAUNCH SCRUBS: - Scrubbed the 8/9/01 launch attempt. The launch window was in two planes; however, at the L-2 day MMT, it was decided not to use Plane 2 for the first launch attempt on Thursday, August 9, 2001. Window opened at 221:21:32:47Z and closed at 221:21:42:46Z or 9M59S total window. With a Preferred Launch Time (PLT) of 221:21:37:46Z, the launch window was 5M00S. Launch attempt was scrubbed at L-25 minutes due to thunderstorms within 20nm, lightening strikes at 12 nm, and detached anvils over the Pad and SLF. All three TAL sites were |
| | | Frank L. Culbertson, Jr. | TDEL: 0.05 -0.148/-0.11 | 2256 FT | | docking. | | | | NON-DEPLOYED: | detached anvils over the Pad and SLF. All three TAL sites were |
| | | (Flt 3 - STS-38, STS-51) P634/R116/V95/M105 | 0.05 -0.148/-0.11 | NLGTD: 4971 FT | | Street, Street | 1 | | 7 | 1511356 LBS CARGO TOTAL: | GO. Weather Scrub. Launch set for Friday, August 10. |
| | | 1 034/10110/ | MAX Q NAV: | 234:18:23:10Z VEL: 157 KGS | | 高级 | | The state of | | | LAUNCH WINDOW: |
| | | M/S 4 UP/EXP 3 SPLT: | 723 715 | 149 KEAS | 1 | | Service of the last | MANUAL PROPERTY. | | | LAUNCH WINDOW: -Launch window opened at 222:21:10:14Z and closed at 222:21:20:12Z, giving a total launch window of 9M58S. The PLT (Preferred Launch Time) of 222:21:15:13Z (In Plane Time) was selected, which gave a planned window of 4M59S. During the late count, thunderstorms were moving toward the launch site from the Southwest and forecast to be within 30 nm of the Pad and SLF at launch time. At L-27 minutes, the Ops Manager made the decision to increase the probability of launching by moving the Launch Time to the opening of the launch window (222:21:10:14Z), giving the ultimate launch window of 9M58S. Weather was observed GO at RTLS landing time for PLT and Window Open Time |
| | | Vladimir N. Dezhurov | CDD CTC | HDOT: -6.9 FPS | | 1 3/ | 1 | THE | | PERFORMANCE NAME OF THE PERFORMANCE | (Preferred Launch Time) of 222:21:15:137 (In Plane Time) was |
| | | (Russia) (Flt 2 - STS-71) | <u>SRB STG</u> : 2:02.2 2:07 | DRAG CHUTE | 12 | 17 16 | A sold | Gillada | | MARGINS (LBS): FPR: 3065 | selected, which gave a planned window of 4M59S. During the |
| 12 * S | TURCK | P635/R195/V174/M170 | 2.02.2 2.07 | DEPLOY: KEAS | | 2 | | | | FUEL BIAS: 937 | late count, thunderstorms were moving toward the launch site |
| 6 th | | 1 000/10176/417 1/101170 | PERF: NOMINAL | 234:18:23:01Z | | 10 | | | | FINAL TDDP: 705 | and SLF at launch time. At L-27 minutes, the Ops Manager made |
| 5 | | M/S 5 UP/EXP 3 Flt Enq: | | BRK INIT: 78 KGS | | | | I. | 100 | RECON: 631 | the decision to increase the probability of launching by moving the |
| * ** | * † | Mikail Tyurin | 2 ENG TAL (BEN): 2:27 2:21 | | | - | The same of | THE STATE OF THE PARTY OF THE P | | DAVILOADO | (222:21:10:147) giving the ultimate launch window of 9M58S |
| E + 1 | N g | (Russia) P636/R270/M236 | 2:27 2:21 | DRAG CHUTE JETTISON: | | DESCRIPTION | District Contract | | 8 | PAYLOADS: | Weather was observed GO at RTLS landing time for PLT and |
| 2 | | 1 030/11/2/0/11/1230 | NEG RETURN: | 56 KGS | | | | | | PLB: ISS-7A.1 | Time of open time. |
| * 70 | 15 | M/S 3 DN/EXP 2 Flt Eng 1: | 3:55 3:58 | 234:18:23:43Z | ares(5067 2001/06/12 18:53. | - | | | | (MPLM, ICC crew | LAUNCH DELAYS: NONE - Launch occurred On-Time at 222:21:10:14Z, Friday, August 10, 2001 at 5:10:14 PM EDT. |
| CHAPOR | TOPA | James S. Voss | DTA (11/0 4/3) | BRK DECEL FPS ² : | M 3 EOM: | ET | | DEORBIT: | | rotation) | - Launch occurred On-Time at 222:21:10:14Z, Friday, August 10, |
| VOSS VCA | HEB HELMS | (Flt 5 - STS-44, STS-53, STS-69, STS-101, | PTA (U/S 163): 4:35 4:36 | AVE 3.8 PK 4.9 | WEIGHT: | <u>RPT:</u> 283K | | APOGEE 218.8 NM | | Heat, GAS (2) RMS, ODS | |
| | | STS-102 UP) | 4.30 4:30 | WHEELS STOP: | WEIGHT: 220682 LBS | 700V | | PERIGEE | | KIVIS, UUS | TAL WX: |
| | | P637/R136/V85/M121 | SE OPS ³ : | 234:18:24:05Z | 220002 LD3 | ET | | 199.2 NM | | MIDDECK: | - All three TAL sites were forecast and observed GO (Zaragoza (prime), Moron, and Ben Guerir). Moron was selected because it |
| | | | 5:25 | 11544 FT | X CG: | <u>IM</u> PACT | | | | None | had the best weather (ZZA had potential for winds and rain). |
| | | | | ROLLOUT: | 1083.96 | 1:14:21 | | ENTRY | | E 0000 TV 05T0 | PERFORMANCE ENHANCEMENTS: |
| | NILL | | PTM (U/S 163): | 10036 FT | | MET | | VELOCITY: 25909 FPS | | 5 CRYO TK SETS 6 GN2 Tanks | - Standard Set plus PE Operational High Q SUM/AUG, 52 nm MECO, and Del Psi. |
| | . ໘ ∴ ↑ | + | 6:36 6:44 | 66 SEC | LANDING: | LAT: | | 2J7U7 I T S | | RMS 63 | MECO, and Del Psi. |
| / e | | ■ in <mark>∰</mark> i | | | | 36.7°S | | ENTRY | | | FIRSTS/LASTS: |
| 11.0 | + | | Continued | Continued | WEIGHT: | | | RANGE: | | RMS used to install | - First Shuttle round trip with Expedition rotation crews |
| //# | + > | | | | 222620 LBS | LONG: | | 4286 NM | | MPLM on Node 1 | (Expedition 3 crew up, Expedition 2 crew down). |
| L. Alexander | + | | | | X CG: | 157.75°W | | | | and berth in PLB, to install EAS on P6 | RENDEZVOUS #55: |
| | SS-741 | | | | 1085.62 | | | | | truss, and EVA | Rendezvous and dock with ISS-PMA 2 Lab Forward Port |
| | | | | | | | | | | Support | Continued |
| | | Continued | | | | | | | | | |
| | | | | | | | | | | | |

| | | SP | ACE SH | UTTLE | MIS | SIO | NS SU | MM | ARY | Page 2-141 - STS-105 |
|-----------------------------------|---|-------------------------------|--|--|---------------------------------|----------------------------------|--------------------------------|--------------------------------|---|---|
| FLT ORBITER | CREW (7 UP/7 DOWN) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-105/ ISS 7A.1 Continued | Continued M/S 4 DN/EXP 2 Flt Eng 2: Susan J. Helms (Flt 5 - STS-54, STS-64, STS-78, STS-101, STS-102 UP) P638/R158/V108/F19 M/S 5 DN/EXP 2 CDR: Yuri V. Usachev (Flt 2 - STS-101) (Russia) (STS-102 UP) P639/R256/V168/M223 SS EVA #68 EMU/TETHERED EVA #61 SCHEDULED EVA #62 DURATION 6:16 SS EVA #69 | OMS-2: 38:34 96.4 96.2 | Continued WINDS: 3T 6L OFFICIAL: 04007P11 SS: 6L 3T PK: 10L 4T DENS ALT: 1816 FT FLT DURATION: 11:21:12:45 S/T: 943:12:45:47 OV-103: 241:22:40:35 DISTANCE: 4,912,390 sm | STS105-E-5 involved thre shirts) front t | e crews to back, 0 STS-10 | , shown Culberts 5 crew (s | on/RSA, Dez stripped shirts | EXP 3 c hurov/R s) front | 5 mission crew (white SA, & row, Forrester | Continued FLIGHT DURATION CHANGES: - Total changes-one orbit weather extension. NEOM was at KSC on orbit 186 at approximately 12:46 PM EDT. EDI not called up. At Tig-25 minutes, waved-off landing due to observed and forecast thunderstorms and rain showers with more fixed to the SLF. STA reported there was not-a-cloud-in-the-sk Florida except for the rain cell that persisted at 1 or 2 mile of the SLF, which caused the wave-off. Landed at KSC 10 orbit 187 at 234:18:22:59Z, 2:2:59 PM EDT, on Wednesda August 22, 2001. EVENTS: - ISS capture was at 1:21:31:27 MET, 224:18:41:41Z ISS hard dock at PMA2 Lab Forward Port at 1:21:53:39Z 224:19:03:53Z First ISS hatch opening at 1:23:30 MET, 224:20:41:14Z RMS grapple of the MPLM at 2:15:41:46 MET, 225:12:51. MPLM installed on Node 1 at 2:18:35:37 MET, 225:15:41. IELK time and Command Handover Time (ISS transfer fr 2 crew to Exp 3 crew and Cmd from Usachev to Culbertsc 225:19:15Z Exp 2 habitant time (Usachev=156:08:35, Voss=154:14: Helms=152:10:34). OV-105 crew ISS Visitor Time=7:19:4. EVA 1 Start time 228:13:58:14Z, 5:16:48:00, duration 64-EAS installed on P6 Truss and Pip Pin in at 228:15:40:05:18:29:47 MFT. |



STS105-E-5265 --- Barry (left) and Forrester surround Early Ammonia Servicer (EAS), to be installed on P6 during EVA 1.



SIGNIFICANT ANOMALIES:
- Loss of AC2 phase A during MPM stow
- Zero-G connector loose O-rings

- Safety tether hook lock guard inadvertently released on EV2's safety tether - GPS ADL-CC-15 anomaly (MAGR tracking difficulty)

- Ku-Band Power Output low

- OPS Recorder 1 degraded tracks

Nose Wheel Steering switch anomaly
 Left OMS Crossfeed low point drain line heater failure

- TCS power supply under-voltage annunciations



nsion. NEOM was to land 2:46 PM EDT. EDW was d-off landing due to nd rain showers within 20 t-a-cloud-in-the-sky over isted at 1 or 2 miles south Landed at KSC 15 on EDT, on Wednesday,

T, 224:20:41:14Z.

46 MET, 225:12:52:00Z. 37 MET, 225:15:45:51Z.

ime (ISS transfer from Exp achèv to Culbertson) at

:35, Voss=154:14:17, /isitor Time=7:19:47:44.

48:00, duration 6H16M. n in at 228:15:40:02Z,

5:17:56:26Z, 3:20:48:12 MET, delta V 6.0 ft/sec, altitude increase 1.7 nm, orbit 218 by 208

Second Reboost maneuver started at 229:12:12:27Z, 6:15:02:13 MET, delta V 6.4 ft/sec, altitude increase 1.8 nm, orbit 218.8 by 209.5 nm.

- EVA 2 started at 230:14:32Z, 7:16:32 MET, and ended at

230:20:01Z, duration 5M29S.

SimpleSat deployed from Gas Can at 232:18:29:14Z, 9:21:19:00

- Total transferred to ISS 10651 lbs; 9657 lbs cargo (MPLM 6314, ICC 1549, MD 1794, H2O 10 CWC's with 993.8 lbs). Total transferred from ISS 3802 lbs (MPLM 2564, ICC 0, MD 1238). Net transfer from Shuttle to ISS=6849 lbs.

- Crew rotation, Exp 3 up and Exp 2 down. Delivered and installed EAS on P6 Truss and attached cables. Clamped MISSE to ISS Airlock handrails. Installed 11 handrails on U.S. Lab.

- Undocked at 232:14:51:37Z.

ISS Visitor Time is 7:19:47:44. Exp 2 Crew ISS Flight Time 167:06:40:50 (New U.S. record). Exp 2 Crew ISS Habitant Times: Usachev 156:08:35:00 (ISS record), Voss 154:14:17:00, Helms 152:10:34:00 (Times based on Exp 2 to Exp 3 IELK transfer times).





SCHEDULED EVA #63 **DURATION 5:29**

MCC WHITE FCR (36)

FLIGHT DIRECTORS:

O 2 - K. B. Beck

A/E/ O1 - J. P. Shannon LD/O1 - P. F. Dye

PLNG/O3 - B. P. Austin

ISS LD/O1 - M. J. Ferring ISS 02 - R. E. La Brode

ISS P/O3 - J. M. Curry

| | CREW LANDING SITE/ SSME-TL | | | | | | | | | | | | |
|-----------------|----------------------------|---|-----------------------------------|--|------------------------------|--|--------------|------------------------|-----------|--|--|--|--|
| | | CREW | | LANDING SITE/ | | | | | | | | | |
| | | 7 UP/7DOWN | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS | | |
| FLT | ORBITER | | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, | | |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, | | |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) | | |
| | 01/405 | | 1/00 000 | WINDS | ENG. S.N. | DI 440 | F4 (0 | DIDEOT | 01.00 | 04000 | | | |
| STS-108/ | OV-105 | CDR: Dominic L. Gorie | KSC 39B 339:22:19:28Z | KSC 15 (KSC 57) 351:17:55:12Z | 104/104/ 109% | BI-110 | | DIRECT INSERTION | | <u>CARGO</u> : 38177 LBS | Brief Mission Summary: The STS-108/UF 1 (12th ISS mission) | | |
| ISS UF-1 | (Flight 17) | (Flt 3 - STS-91, STS-99) | 5:19:28 PM EST (P) | 11:55:12 AM EST | 109% | RSRM | (12) | INSERTION | (6) | 381// LBS | provided a new crew to the ISS, transfer of supplies and | | |
| 050 | Endeavor | P640/R242/V157/M211 | 5:19:28 PM EST (A) | 11.33.12 AW L31 | PREDICTED: | 82 | | POST OMS-2: | | PAYLOAD | equipment via the Raffaello MPLM, and an EVA to install | | |
| SEQ FLT #107 | | | Wednesday 12 | Monday 20 | 100/104.5/ | | | 124.2 X 121.6 | | CHARGEABLE: | thermal blankets at the bases of the solar panels. Launch | | |
| FLI #107 | OMS PODS: | <u>PLT</u> : | 12/5/01 (7) | 12/17/Ŏ1 (13) | 104.5/72/ | ET-111 | | NM | | 31393 LBS | was scrubbed twice; first due to debris in ISS docking port | | |
| KSC-107 | LPO4-24 | Mark E. Kelly P641/R271/M237 | L ALINIOLI VAUNIDOVA | DEODDIT DUDN | 104.5 | OLIVIT 47 | | | | DEDLOVED | from Progress 6 soft dock, and second due to RTLS and | | |
| | RPO1-31 FRC5-17 | 1 041/102/1/10123/ | LAUNCH WINDOW: 7M34S USING PLT | <u>DEORBIT BURN</u> : 351:16:48:13Z | ACTUAL: | SLWT 16 | | | | DEPLOYED: 6454 LBS | Range weather. | | |
| PAD: 39B-47 | I KC5-17 | <u>M/S 1</u> : | (IN-PLANE TIME) | | 100/104.5/ | | | | | 0434 LD3 | KSC W/D: OPF 142, VAB 6, PAD 34 = 182 days total. | | |
| 39B-47 | | Linda M. Godwin | (IIV I E IIVE I IIVIE) | XRANGE: 26 NM | 93/72/ | | | | | NON-DEPLOYED: | | | |
| MLP-1 | | (Flt 4 - STS-37, STS-59, STS-76) | EOM PLS: KSC | ORBIT DIR: AR 11 | 104.5 | | | | | 8635 LBS | LAUNCH POSTPONEMENTS: - Baselined launch date of 10/4/01 on 9/21/00 | | |
| IVILI - I | | P642/R122/V105/F13 | TAL: ZZA | | | | | | | | - Postponed launch date to NET 11/1/01 | | |
| TWELFTH | | | TAL WX: MRN, BEN | AIM PT: NOMINAL | 1 = 2049 (6) | | | | | MIDDECK: 690 LBS | - Postponed launch date to 11/29/01 | | |
| SHUTTLE | | M/S 2: Daniel M. Tani | SELECTED: | MLGTD: 3024 FT | 2 = 2043 (7) 3 = 2050 (2) | | | | | 090 LBS | LAUNCH SCRUBS: | | |
| FLIGHT TO | | P643/R272/M238 | RTLS: KSC 33/N/N | 351:17:55:12Z VEL: 198 KGS | 3 - 2030 (2) | | | | | SHUTTLE | LAUNCH SCRUBS: - Scrubbed Thursday 11/29/01 EDT (11/30/01 GMT) Launch at ET Tanking MMT at L-9.5 Hours due to an ISS problem. Progress 6 had Soft Docked with SM Aft Port; however, did not achieve Hard Dock. Suspect debris within the docking interface. U.S. ISS Mgmt wanted to work problem and it was decided to go into a 24-hour scrub turnaround, then 48-hr scrub turnaround. Initially IP Russia was GO. U.S. ISS management wanted to scrub to work problem. Then IP Russia announced at ISS MMT on 11/30/01 that they planned an EVA on 12/3/01 to clear debris in docking mechanism. SSP MMT on 11/30/01 set launch for 12/4/01 to allow review of results of EVA. IP Russia EVA crew removed damaged seal from previous Progress enabling Progress 6 to Hard Dock. ISS Technical Scrub (new category of scrub). | | |
| ISS | | 1 043/112/2/11/230 | TAL: ZZA 30/N/N | 201 KEAS | ENGINE 2050 | | | | | <u>ACCUMULATED</u> | Progress 6 had Soft Docked with SM Aft Port: however, did not | | |
| | | M/S 3 UP/EXP 4 Flt Eng: | AOA: NOR 17/N/SF | HDOT: -1.6 FPS | IS BLOCK II | | | | | WEIGHTS: | achieve Hard Dock. Suspect debris within the docking interface. | | |
| | | Carl E. Walz | PLS: EDW 22/N/N | | ENGINE. | | | | | DEPLOYED: | U.S. ISS Mgmt wanted to work problem and it was decided to go | | |
| | | (Flt 4 - STS-51, STS-65, STS-79) | TDEL: | TD NORM 205: 2734 FT | OTHER TWO BLOCK IIA | | | | | 1082139 LBS | Initially IP Russia was GO TLS ISS management wanted to | | |
| | | P644/R170/V106/M148 | 0.03 -0.1568 | | ENGINES. | | | | | NON-DEPLOYED: | scrub to work problem. Then IP Russia announced at ISS MMT | | |
| | | | 0.1000 | NLGTD: 6901 FT | | 0070 /7 [|) o o o mol | per 2001) | | 1520683 LBS | on 11/30/01 that they planned an EVA on 12/3/01 to clear debris | | |
| | | M/S 4 UP/EXP 4 Flt Eng: Daniel W. Bursch | MAX Q NAV: | 351:17:55:24Z VEL: 143 KGS | | | | S with ISS P/L | | | 12/4/01 to allow review of results of EVA IP Russia EVA crew | | |
| | | (Flt 4 - STS-51, STS-68, | 714 708 | 146 KEAS | ISS UF-1 | | | 3 WILL 133 F/L | | CARGO TOTAL: | removed damaged seal from previous Progress enabling | | |
| | | STS-77) | SRB STG: | HDOT: -6.3 FPS | 133 01-1 | (IVIF LIVI, L | .iviC) | | | 3336416 LBS | Progress 6 to Hard Dock. ISS Technical Scrub (new category of scrub). | | |
| | | P645/R169/V109/M147 | 2:05 2:04 | DRAG CHUTE | II All | DOWN AND A | Y | 0.00 | 1600 | PERFORMANCE | Scrub). | | |
| | | M/S 5 UP/EXP 4 CDR: | 2.03 | DRAG CHUTE DEPLOY: 191 KEAS | | | | 4 | | MARGINS (LBS): | - Scrubbed Tuesday 12/4/01 launch due to RTLS and Range | | |
| | | Yuri I. Onufrienko | PERF: NOMINAL | 351:17:55:16Z | | | | | 1 | FPR: 3065 | - Scrubbed Tuesday 12/4/01 launch due to RTLS and Range weather (light precipitation and low ceiling). Low clouds moved into launch area from the Northeast bringing dynamic weather conditions particularly in last hour before launch. RTLS runway selection alternated between 33 and 15. Light rain was reported only by the STA as it was not visible on radar or by SLF Observer. Counted down to T-5 minutes and held while evaluating the observed and forecast weather. Scrubbed at 338:22:44:432 (Preferred Launch Time was 22:45:08Z) while holding at T-5 minutes based on STA observations of precipitation and cloud cover and a late update SMG forecast of broken clouds over SLF runway. RTLS and Range WX Scrub. Went into a 24 hour scrub turnaround. All 3 TAL sites were GO. | | |
| | | (Russia) | | BRK INIT: 92 KGS | | 6 | March | | 20 | FUEL BIAS: 937 | conditions particularly in last hour before launch. RTLS runway | | |
| | | P646/R273/M239 | 2 ENG TAL (MRN): | <u> </u> | | - | and the same | | | FINAL TDDP: 2881 | selection alternated between 33 and 15. Light rain was reported | | |
| | | M/S 3 DN/EXP 3 CDR: | 2:19 2:26 | DRAG CHUTE JETTISON: | | | 1 | | 1 | RECON: 1182 | Only by the STA as it was not visible on radar or by SEF Observer Counted down to T-5 minutes and held while | | |
| 6 | To | Frank L. Culbertson, Jr. | NEG RETURN: | 57 KGS | odes | A POPULA | | C :/ | Section 1 | PAYLOADS: | evaluating the observed and forecast weather. Scrubbed at | | |
| 8 | - ME | (Flt 3 - STS-38, STS-51, STS-105 UP) | 3:48 3:53 | 351:17:56:18Z | | The state of the s | | | | PLB: | 338:22:44:43Z (Preferred Launch Time was 22:45:08Z) while | | |
| 0 | + 0 | STS-105 UP) | | BRK DECEL FPS ² : | W = 1 | | 1 | 198 | | ISS UF-1 | precipitation and cloud cover and a late undate SMG forecast of | | |
| Z W | · V × V | P647/R116/V95/M105 | PTA (U/S 154): | AVE 4.2 PK 6.9 | 1 | | | A PROPERTY. | | (MPLM, LMC) | broken clouds over SLF runway. RTLS and Range WX Scrub. | | |
| | | M/S 4 DN/EXP 3 SPLT: | 4:51 4:58 | WILLELS STOD. | | W. | 100 | | 1 | MACH-1, SEM (1), GAS (5), RMS, ODS, | Went into a 24 hour scrub turnaround. All 3 TAL sites were GO. | | |
| 1000 | | Vladimir N. Dezhurov | SE TAL (ZZA 104): | WHEELS STOP: 351:17:56:18Z | | | | | | Crew Transfer | | | |
| 673 | | (Russia) | 6:03 6:06 | 11965 FT | M 3 EOM: | ET | | DEORBIT: | | Olew Hullsici | - Window opened at 339:22:15:35Z and closed at 339:22:27:02Z | | |
| GERTEHIKO | WALZ OB THE | (Flt 2 - ŚTS-71, STS-105 UP) | | ROLLOUT: | | IMPACT | | 204 X 191 NM | | MIDDECK: | -Window opened at 339:22:15:35Z and closed at 339:22:27:02Z giving a total window of 11:37 in two panes with a 19-second gap between panes. Preferred Launch Time (PLT) in-plane time for pane 1 was 339:22:19:28Z giving a window of 7M34S. | | |
| ON I | EXM | P648/R195/V174/M170 | PTM (U/S 154): | 8941 FT | WEIGHT: | 1:14:20 | | | | ADF | pane 1 was 339:22:19:28Z giving a window of 7M34S. | | |
| | | | 6:20 6:20 | 66 SEC | 220623 LBS | MET | | VELOCITY: 25888 FPS | | CBTM | LAUNCH DELAYS: None | | |
| | | | SE PTM (U/S 736): | WINDS: | X CG: | | | 25888 FPS | | SIMPLEX ISS UF-1 | - Launch occurred On-Time at 339:22:19:27.951Z, 5:19:28 PM | | |
| CREW | ROTATION | J | | 6H, 2L | 1083.79 | LAT: | | <u>ENTRY</u> | | 100 01 -1 | EST, on Wednesday, 12/5/01. | | |
| Z [[F] | | F | | OFFICIAL: | | 36.3°S | | RANGE: | | 5 CRYO TK SETS | TAL WX: | | |
| 2 7 tll | | T _Q | MECO CMD: | 14006P13 | | LONG | | 4416 NM | | 6 GN ₂ TANKS | - All three TAL sites (ZZA, MRN, and BEN) were GO. Zaragoza | | |
| a La | | u u | 8:23.8 8:25.7 | SS: 6H, 2L PK: 13H, 2L | LANDING: | LONG: | | | | - DMC / 4 | was prime but it was a low energy day there, so Moron was selected. | | |
| N | 1000 | 7 4 | | 1 1011, ZL | WEIGHT: | <u>ET</u> | | | | RMS 64 | - MRN was 2-Eng TAL Call | | |
| | | o o | | | 220556 LBS | | | | | RMS used for | J J | | |
| 5 | 1000 | 2 0 | Continued | Continued | | | | | | ISS MPLM deploy | PERFORMANCE ENHANCEMENTS: - Standard Set plus PE Operational High Q, OMS Assist is 4000 | | |
| CARGO | TRANSFE | R | | | X CG: | | | | | and retrieve and | lbs, 52 nm MECO, and Del Psi. | | |
| | | Continued | | | 1085.49 | | | | | EVA support | | | |
| | | | | | | | | | | | Continued | | |

SRB

RSRM

AND

FT

SSME-TL NOM-ABORT

EMERG

THROTTLE

PROFILE

ENG. S.N.

| | | | _ | |
|-----------------------------------|---------|---|--|--|
| FLT NO. | ORBITER | CREW 7 UP/7 DOWN | LAUNCH SITE, LIFTOFF TIME, LANDING SITES. | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES |
| 140. | | TITLE, NAMES & EVA'S | ABORT TIMES | FLT DURATION, WINDS |
| STS-108/ ISS UF-1 Continued | | Continued M/S 5 DN/EXP 3 FIt Eng: Mikail Tyurin (Russia) (STS-105 UP) P649/R270/M236 SS EVA #70 EMU/TETHERED EVA #63 SCHEDULED EVA #64 DURATION 4:11 MCC WHITE FCR (37) FLIGHT DIRECTORS: A/E - L. E. Cain Shuttle LD/O 1 - N. W. Hale Shuttle Plng - C. A. Koerner ISS LD/O 1 - S. P. Davis ISS O 2 - R. E. Castle | Continued VI: 25822 25823 OMS-2: 37:42 37:42 164 FPS 1:48 1:48 | DENS ALT: 1607 FT FLT DURATION: 11:19:35:44 S/T: 955:08:21:31 OV-105 178:22:49:47 DISTANCE: 4,817,649 sm |
| | | ISS PLNG - J. A. McCullough MOD - J. M. Heflin | | |
| | | | | shirts), STS-108 (blue iny Lab. Exp 4 from fro |

SIGNIFICANT ANOMALIES:
- GSE Gaseous Hydrogen (GH2) Vent Arm did not latch-back and the GUCP rebounded beyond FSS. GH₂ Vent Arm contacted side of support structure (Constraint to frext flight) - RCS Thruster R4U Failed-Off and was auto deselected - RCS Thruster F3F Failed-Off and was auto deselected - Loud white noise was heard on A/G 2 after SSOR 1 was

HA/HP

ORBIT

- Loud white holds was heard of Ard 2 after 330K i was tied to Orbiter Audio Bus - IMU 2 Platform fail and redundant rate BITE - Left RCS Oxidizer B Regulator Low Flow-Pressure - FES Secondary Hi-Load Not Controlling - Tear or hole on drag chute main canopy during dis-reef, 5 ribbons torn and 2 stretched

- Failed Ties Between Sabot and Pilot Chute Bag



ABOVE:STS108-328-007 (16 December 2001) --- A small satellite called STARSHINE 2 is deployed for 30,000 students studying density of Earth's upper atmosphere

BELOW: STS108-E-5359 (10 December 2001) --- Godwin & Tani install insulation blankets on ISS solar array rotation mechanisms.



to back, CDR Onufrienko, Bursch/FE, & Walz/FE. STS-108 back

row, Godwin/MS, PLT Kelly, CDR Gorie, & Tani/MS. Exp 3 crew

from front to back. CDR Culbertson, Dezhurov/FE & Tyurin/FE.



Continued...

PAYLOAD

WEIGHTS.

PAYLOADS/

EXPERIMENTS

FSW

FLIGHT DURATION CHANGES:

- Extended flight one docked day to allow time for additional ISS tasks. Initially planned (before extension) to land at KSC on orbit 170. After one day extension, planned landing at KSC on orbit 186. Endeavour landed at KSC on Runway 15 on orbit 186 at 351:17:55:11Z, 122:55:11 PM EST on Monday, December 17, 2002.

MISSION HIGHLIGHTS

(LAUNCH SCRUBS/DELAYS. TAL WEATHER, ASCENT I-LOADS

FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

FLIGHT DURATION CHANGES:
- SMG Weather forecast for KSC on Tig orbit 185/Landing orbit 186 was forecast NO GO due to ceiling (3000 broken and 6500 broken). However, STA was reporting an observed GO and several positive factors provided the FD confidence to give a GO for landing on orbit 186. A Flight Rule waiver was approved post flight.

First flight of Block II SSME (S/N 2050) in position 3.

- MC4 maneuver at 341:16:52Z, 01:18:32 MET, orbit 195.8 by 209.7

- ODS captured ISS at 341:20:03:25Z, 1:21:43:58 MET - MPLM grappled by RMS at 342:16:14Z, 2:17:54 MET, unberthed at 342:17:00Z, 2:18:40 MET and installed on NODE, RMS ungrappled

MPLM at 342:18:09:20Z, 2:19:49 MET.
- Reboost #1 Start at 343:15:11:40Z, 3:16:52:12 MET, Delta V = 6.3 FPS, altitude increase 1.9 nm, resulting orbit 210.6 by 199.0 nm.
- EVA 1 Start at 344:19:34Z, 4:21:14 MET, duration of 4 hours 11

EVA 1 Start at 344:19:34Z, 4:21:14 MET, duration of 4 hours 11 minutes. Installed MLI blankets on Beta Gimbal Assembly on solar arrays 4B and 2B. Removed SASA blanket and pre-positioned Circuit Interrupt Devices (CID's).

Reboost #2 Start at 345:16:19:40Z, 5:18:00:12 MET, Delta V = 6.5 FPS, altitude increase 1.8 mm, resulting orbit 211.3 by 201.2 nm.

Reboost #3 Start at 346:15:22:32Z, 6:17:03:04 MET, Delta V = 14.1 FPS, altitude increase of 4.0 nm, resulting orbit 213.4 by 206.9 nm.

Reboost #4 was performed for collision avoidance. Started at 349:14:55:40Z, 9:16:36:13 MET, Delta V = 2.1 FPS, altitude increase of 0.6 nm, resulting orbit 213.8 by 206.3 nm.

349:14:55:40Z, 9:16:36:13 ME1, Delia V = 2.1 FPS, altitude increase of 0.6 nm, resulting orbit 213.8 by 206.3 nm.
- Undocking: 349:17:28:35Z, 9:19:08 MET
- ISS Separation burn at 349:17:28:35Z, 9:19:09:08 MET
- Total water transferred to ISS was 299 lbm (210.3 lbm in 3 CWC's plus 88.7 lbm in 4 PWR's).

- Total transfers from Shuttle to ISS was 6244 lbs (from MPLM 5249 lbs and Middeck 995 lbs), total transfer from ISS was 4156 lbs (in MPLM 3007 lbs and to Middeck 1149 lbs).

Endeavour/ISS Visitor Time is 7:21:25:11

Expedition 4 Crew Up, Expedition 3 Crew Down.
Expedition 3 Crew ISS Habitant Time - 117:02:57:00.
Expedition 3 Crew Flight Time - 128:20:44:58

Culbertson Total Flight Time - 143:14:50:31 Official transfer time from Expedition 3 to Expedition 4 crew was

342:22:12:00Z.

RENDEZVOUS #56: Rendezvous and dock with ISS to PMA2 Lab Fwd Port. Expedition 4 Crew Up, Expedition 3 Crew Down.





| | | CREW | LAUNCH CITE | LANDING SITE/ | SSME-TL | CDD | | ORBIT | | DAVLOAD | MICCIONTILICITE |
|----------------|-----------------------|--|--|--|------------------------------|--------------------------|---------------|------------------------------------|------|------------------------------------|--|
| FLT | ORBITER | (7) | LAUNCH SITE, LIFTOFF TIME, | RUNWAY, CROSSRANGE | NOM-ABORT EMERG | SRB RSRM | | UKBII | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION. | THROTTLE PROFILE | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | & EVA'S | | WINDS | ENG. S.N. | | | | | | |
| STS-109 | OV-102 (Flight 27) | CDR: Scott D. Altman | KSC 39A 60:11:22:01:99Z | KSC 33 (KSC 58) 71:09:31:53Z | 104/104/ 109% | BI-111 | 28.45 (50) | DIRECT INSERTION | | <u>CARGO</u> : 27564 LBS | Brief Mission Summary: The STS-109 mission was the 4th Servicing Mission to the Hubble Space Telescope to |
| SEQ | Columbia | (Flt 3 - STS-90, STS-106) P650/R237/V161/M207 | 6:22:02 AM EST (P) 6:22:02 AM EST (A) | 4:31:53 AM EST | PREDICTED: | RSRM 83 | (/ | POST OMS-2: | () | PAYLOAD | rejuvenate the World's Greatest Observatory. During five EVA's the crew replaced the Reaction Wheel Assembly, the |
| FLT # 108 | | | Friday 24 | Tuesday 20 | 100/104.5/ | | | 310.5 x 105.0 | | CHARGEABLE: | solar arrays, the Power Control Unit (down since 1999) and |
| KSC-108 | OMS PODS: LPO5-16 | PLT: Duane Carey | 3/1/02 (8) | 3/12/02 (9) | 104.5/72/ 104.5 | ET-112 | | NM | | 20144 LBS | installed a new scientific instrument, the Advanced Camera for Surveys (ACS). The ACS is able to survey a field of the |
| PAD 39A-61 | RPO5-15 FRC2-27 | P651/R274/M240 | LAUNCH WINDOW: HST Planar/Phase | <u>DEORBIT BURN:</u> 71:08:22:39Z | ACTUAL: | SLWT-17 | | | | DEPLOYED: 8256 LBS | cosmos twice as large as previous instruments, with ten |
| 371101 | | M/S 1/EV1: John Grunsfeld | Window 61M51S | XRANGE: 268 NM | 100/104.5/ 101/72/ | FT | | | | <u>NON-DEPLOYED</u> : | times the resolution and four times the speed. |
| MLP-2 | | (Flt 4 - STS-67, STS-81, STS-103) | EOM PLS: KSC TAL: BEN | ORBIT DIR: DL 48 | 104.5 | IMPACT 1:28:35 | | <u>DEORBIT</u> : 312.6 x 259 NM | | 10672 LBS | KSC W/D: OPF 253, VAB 8, PAD 32 = 293 days total. |
| Fourth HST | | P652/R191/V133/M167 | TAL WX: NONE | <u>aim Pt</u> : Nominal | 1 = 2056 (2) | MET | | | | MIDDECK: | LAUNCH POSTPONEMENTS: - Baselined launch date of 11/1/01 on 9/21/00 |
| Service Flight | | <u>M/S 2</u> : | SELECTED: | MLGTD: 3433 FT 71:09:31:53Z | 2 = 2053 (4) 3 = 2047 (7) | <u>LAT</u> : | | VELOCITY: 26082 FPS | | 1216 LBS | - Postponed launch date to NET 11/19/01 on 5/4/01 - Postponed launch date to 1/17/02 on 5/10/01 |
| | | Nancy Currie (Flt 4 - STS-57, STS-81, | RTLS: KSC 15/CI/N TAL: BEN 36/N/N | VEL: 196 KGS 186 KEAS | | 16.3°N | | <u>ENTRY</u> | | SHUTTLE ACCUMULATED | - Postponed launch date to 2/14/02 on 10/4/01 |
| | | ŠTS-103) P653/R165/V120/F21 | AOA: EDW 22/N/N PLS: EDW 04/CI/N | HDOT: -2.7 FPS | ALL SSME'S BLOCK IIA | <u>LONG</u> : 143.6°W | | RANGE: 4274 NM | | WEIGHTS: DEPLOYED: | - On 12/21/01, postponed launch date to NET 2/21/02 to allow manifest of new RWA (new HST problem) and train EVA crew. |
| | | M/S 3/EV2: | TDEL: | TD NORM 195: 2993 FT | DEO OIC III | 110.0 11 | | 127 1 14141 | | 1090395 LBS NON-DEPLOYED: | - On 1/10/02, postponed launch date to 2/28/02, had to prepare and ship another RWA to KSC. First RWA was faulty. |
| | | Richard Linnehan | -0.03 -0.26/-0.023 | NLGTD: 6286 FT | | | | | | 1532571 LBS | LAUNCH SCRUBS: |
| | | (Flt 3 - STS-78, STS-90 P654/R214/V150/M187 | MAX Q NAV: | 71:09:32:01Z VEL: 156 KGS | | | - 3 | | | CARGO TOTAL: 3363980 LBS | - 2/28/02 Launch was scrubbed at approximately L-16 hours due to forecast of cold weather at pad at LCC limits. Forecast was for |
| | | M/S 4/EV3: | 693 ??? 754 | 149 KEAS HDOT: -5.6 FPS | The same | And a | | | | PERFORMANCE | 38 deg, 73 percent humidity, winds 7 to 10 knots. This forecast is |
| | | James Newman (Flt 4 - STS-51, STS-69, | <u>SRB STG</u> : 2:06 2:07 | DRAG CHUTE | | The same | | | | MARGINS (LBS): FPR: 3065 | one degree above the minimum temperature, and MMT decided to scrub and reschedule launch for 3/1/02. Observation S at |
| | | STS-88) P655/R168/V122/M146 | PERF: NOMINAL | DEPLOY: 181 KEAS 71:09:31:55Z | 100 | | TO ton | | | FUEL BIAS: 937 FINAL TDDP: 3309 | launch time were 28 deg, RH 71 percent, winds 7 to 10 knots. Wx scrub #36. |
| | | | | BRK INIT: 66 KGS | 1.1 | | 5 TES | | | RECON: 4170 | LAUNCH WINDOW: |
| | | M/S 5/EV4: Michael Massimino | <u>2 ENG TAL (BEN)</u> : 2:17 2:16 | DRAG CHUTE | | | San 18 | | | PAYLOADS: | - Window was in 2 panes: Pane 1 opened at 60:11:22:02Z and closed at 60:11:27:23Z (5M21S window), pane 2 opened at |
| | | P656/R275/M241 | NEG RETURN: | JETTISON: 63 KGS | 3// | | (0) | | 170 | PLB: HST | 60:11:27:33Z and closed at 60:12:23:53Z (56M20S window), and |
| | MARI | SS EVA #71 | 3:55 3:59 | 71:09:32:37Z | | | 1 | | | Service Mission 3B RMS | combined panes 1 & 2 yielded a window of 61M51S with a cutout from 11:23:20 to 11:24:20. |
| 10 | CU | EMU/TETHERED EVA #64 | PTA (U/S 530): 3:50 3:55 | BRK DECEL (FPS ²): AVE 3.7 PK 7.2 | M 3 EOM: | Later inc | Δ. | 20 10 10 10 | | MIDDECK: | LAUNCH DELAYS: NONE |
| 5 7 | The second | SCHEDULED EVA #65 DURATION 7:01 | PTM (U/S 500): | WHEELS STOP: | WEIGHT: | Clean Ro | om at | CS.jpg in th GSFC two mer | n in | NONE | - Launched On-Time at 60:11:22:02Z, 6:22:02 AM EST, on March 1, 2002. |
| 3 | A 2 | SS EVA #72 | 5:06 5:08 | 71:09:33:05Z 13552 FT | 222447 LBS | | | and near the no lled on HST. | | 5 CRYO TK SETS 5 GN2 TANKS | TAL WX: |
| UNS | TO THE SECOND | EMU/TETHERED | SE TAL (BYD): | ROLLOUT: 10119 FT | X CG: | ACS 10 b | e ilista | ilea on rio i. | | | - Ben Guerir was the only TAL site available. Ben Guerir was forecast and observed GO. |
| 8/1/18 | | EVA #65 SCHEDULED EVA #66 | 5:50 5:50 | 72 SEC | 1082.87 | | | | | RMS 65 | |
| Charles II | | DURATION 7:16 | MECO CMD: 8:21.5 8:23.9 | <u>WINDS</u> :T5, R2 <u>OFFICIAL</u> : | <u>LANDING</u> : | | | | | RMS USED FOR: HST GRAPPLE, | SHUTTLE NIGHT LAUNCH #27 |
| EHAN | NEW | | | 13005P08 SS: T5, R2 | WEIGHT: 222366 LBS | | | | | BERTH, SERVICE, AND RELEASE. | RENDEZVOUS #57: Rendezvous and berth HST, performed service operations, and |
| | | Continued | Continued | PK: T8, R3 | X CG: | | | | | | released HST. |
| | | | Continueu | Continued | 1084.57 | | | | | | Continued |
| | | | | | | | | | | | |

SRB

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AND

ET

SSME-TL NOM-ABORT

EMERG

THROTTLE

PROFILE

| FLT NO. | ORBITER | CREW (7) TITLE, NAMES & EVA'S | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS |
|--|--|---|---|---|
| STS-109 | | Continued | Continued | Continued |
| Continued | | SS EVA #73 EMU/TETHERED EVA #66 SCHEDULED EVA #67 DURATION 6:48 SS EVA #74 | <u>VI</u> : 26114 26113 <u>OMS-2</u> : 44:00 43:57 134 FPS 134 FPS 1:27 1:27 | DENS ALT: 326 FT FLT DURATION: 10:22:09:51 S/T: 966:06:31:22 |
| MCC WHITE FLIGHT DIR LD/O 1 - B. F O 2 - A. J. Co PLNG - J. M. A/E - J. P. SI MOD - N. W. | ECTORS: P. Austin eccacci . Hanley hannon | EMU/TETHERED EVA #67 SCHEDULED EVA #68 DURATION 7:30 SS EVA #75 EMU/TETHERED EVA #68 SCHEDULED EVA #69 | 1.2. | 966:06:31:22 OV-102: 284:19:19:08 DISTANCE: 3,941,705 sm |



ORBIT

HA/HP

INC

STS109-E-6032 --- Crew on middeck, From left (front row): Currie/MS, CDR Altman, & PLT Carey. From the left (back row): Grunsfeld/PLC, Linnehan/MS, Newman/MS, & Massimino/MS.



PAYLOAD

WEIGHTS.

PAYLOADS/

EXPERIMENTS

FSW

PERFORMANCE ENHANCEMENTS:
- Standard Set Plus PE Operational High Q, WIN/FEB

SHUTTLE NIGHT LANDING #19

KSC NIGHT LANDING #14

FLIGHT DURATION CHANGES: NONE

- Planned landing at KSC on orbit 166. Landed at KSC Runway 33 on orbit 166, MLGTD at 71:09:31:53Z on Tuesday, March 12,

MISSION HIGHLIGHTS

(LAUNCH SCRUBS/DELAYS,

TAL WEATHER, ASCENT I-LOADS

FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

- OMS-2 Start at 60:16:43:49Z, 13.8 duration, Delta V 10.3 ft/sec, resultant orbit 105.0 by 310.5 nm.

NH maneuver (OMS-4) at 62:04:07:30Z, 207 seconds duration, Delta V 326.6 ft/sec, resultant orbit 302.2 by 309.2 nm. MC-4 at 62:08:23:29Z, resultant orbit 303.4 by 314.9 nm.

HST capture by RMS at 62:09:31:21Z, and HST berth on FSS in PLB at 62:10:31:Z. 1:22:09:19 MET.

EVA 1 Start at 63:06:37Z, 2:19:15 MET, End at 63:13:38Z, duration 7H01M. Replaced old SA with -V2 Solar Array 3 and diode box.

EVA 2 Start at 64:06:41Z, 3:19:19 MET, End at 64:13:57Z, duration 7H16M. Replaced old SA with +V2 Solar Array 3 and diode box. Preplaced Reaction Wheel Assembly. Installed NOBL in Bay 6 and two doorstop extensions (one on -V2 side and one on +V2 side.)

 EVA 3 Start 2 hrs late at 65:08:28Z, 04:21:06 MET (EMU 1 got water in suit), hence had to resize EMU 3 for use by EV1. EVA duration 6H48M. Powered down HST and replaced PCU (Power Control Unit).

- EVA 4 Start at 66:09:00Z, 5:21:38 MET, duration 7H30M. Replaced FOC (Faint Object Camera) with new ACS (Advanced Camera for Surveys), installed Electronics Support Module and

PCU clean up tasks.
- EVA 5 Start at 67:08:46Z, 6:21:24 MET. Installed NICMOS Camera and cryogenic cooler, duration 7:20.
- HST Reboost started at 67:17:18:04Z, 7:05:56:02 MET, Delta V

11.8 fps, altitude increase 3.6 nm, orbit of 314.7 by 310.6 nm.

HST unberthed from Orbiter at 68:08:34Z, 7:21:12 MET and released at 68:10:04Z, 7:22:42 MET.

- Orbit Adjust maneuver at 70:10:07:32Z, 48.3 seconds, Delta V

11.6 fps, orbit 259 by 312.5 nm.

Last flight of Block IIA Engines.



DURATION 7:20

STS109-713-014 (8 March 2002) --- Grunsfeld/MS (right) and Linnehan/MS during 5th EVA completing HST upgrades.



STS109-331-005 (9 March 2002) ---Rejuvenated HST flies away.

SIGNIFICANT ANOMALIES:

- Freon® Loop 1 Aft Coldplate Flow Blockage
- Loss of EV1 Suit data during EVA
- Starboard Slidewire Slider Anomaly
- Inner Airlock "A" Hatch locking device difficult to
- APU 3 Drain Line Pressure Decay
- MPS LH2 4-Inch Recirculation Disconnect Slow to
- Forward THC -X Contact Lost During One Burn
 FES Accumulator/Hi-Load Feedline B Heater
- System 2 Failure
- Primary RCS Thruster R3R Failed Off
- Water leaking from EMU 1 PLSS

| | | 3P | NS SU | IVI IV | IART | 1 age 2-140 - 313-110/0A | | | | |
|---|--|---|--|---|--|--------------------------|--|-----|--|--|
| FLT ORBITER NO. | CREW (7) TITLE, NAMES | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES | SSME-TL NOM-ABORT EMERG THROTTLE | SRB RSRM AND | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, |
| STS-110/ ISS 8A SEQ FLT #109 KSC-109 RSC-109 MLP-3 THIRTEENTH SHUTTLE FLIGHT TO ISS OV-104 (Flight 25) Atlantis OMS PODS: LPO3-29 RPO4-25 FRC4-25 | & EVA'S CDR: Michael J. Bloomfield (Flt 3 - STS-86, STS-97) P657/R227/V165/M198 PLT: Stephen N. Frick P658/R276/M242 MS1/EV2: Rex J. Walheim P659/R277/M243 M/S 2: Ellen Ochoa (Flt 4 - STS-56, STS-66, STS-96) P660/R180/V113/F20 M/S 3/EV4: Lee M. E. Morin P661/R278/M244 M/S 4/EV3: Jerry L. Ross (Flt 7 - STS 61-B, STS-27, STS-37, STS-55, STS-74 STS-88) P662/R89/V38/M80 MS5/EV1: Steven L. Smith (Flt 4 - STS-68 STS-82) | ABORT TIMES KSC 39B 98:20:44:19Z 4:39:31 PM EDT (P) 4:44:19 PM EDT (A) Monday (12) 4/8/02 (15) LAUNCH WINDOW: 4M59S PLT (In-Plane Time) with ISS EOM PLS: KSC TAL: ZZA TAL WX: MRN, BEN SELECTED: RTLS: KSC 15/CI/N TAL: ZZA 30/CI/N ADA: KSC 15/CI/N | FLT DURATION, WINDS KSC 33 (KSC 59) 109:16:26:58Z 12:26:58 PM EDT Friday 12 4/19/02 (11) DEORBIT BURN: 109:15:18:59Z XRANGE: 73 NM ORBIT DIR: AL 30 AIM PT: NOMINAL MLGTD: 3058 FT 109:16:26:58Z VEL: 197 KGS 193 KEAS HDOT: -2.2 FPS TD NORM 195: 3070 FT NLGTD: 6353 FT 109:16:27:08Z VEL: 146 KGS 137 KEAS HDOT: -5.9 FPS DRAG CHUTE DEPLOY: 186 KEAS | PROFILE ENG. S.N. 104/104/ 109% PREDICTED: 100/100/100/ 67/104 ACTUAL: 100/100/100/ 72/104 1 = 2048 (4) 2 = 2051 (3) 3 = 2045 (6) ALL THREE SSME'S BLOCK II M 3 EOM: WEIGHT: 201513 LBS X CG: 1085.32 | ET RSRM 85 ET-114 SLWT-18 ET INPACT IN-14:19 MET LAT: 35.8°S LONG: 158.8°W | 51.60 (13) | DIRECT INSERTION POST OMS-2: 124.1 X 84.8 NM ENTRY: HA/HP 218.7 X 166 NM ENTRY VELOCITY: 25917 FPS ENTRY RANGE: 4354 NM | (1) | CARGO: 35849 LBS PAYLOAD CHARGEABLE: 28379 LBS DEPLOYED: 30600 LBS NON-DEPLOYED: 0 LBS MIDDECK: 757 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 1122264 LBS NON-DEPLOYED: 1533328 LBS CARGO TOTAL: 3399829 LBS PERFORMANCE MARGINS (LBS): FPR: 3065 FUEL BIAS: 937 FINAL TDDP: 1256 | Brief Mission Summary: The STS-110/8A (13th mission to ISS) was the most complex ISS assembly flight to date with four EVA's and extensive use of Shuttle and ISS robotic arms. The EVA included successful beam assemblies, bolting of girders, and installing work lights and electrical connections. The ISS Canadarm2 transferred the 13.5 ton, 43-foot long S0 Truss (ISS backbone) from Shuttle payload bay for installation on U.S. Lab, Destiny. Also, the first railcar was operated on the new truss, paving the way for eventual transportation for the Canadarm2 along the length of the ISS. KSC W/D: OPF 132, VAB 6, PAD 28 = 166 days total. LAUNCH POSTPONEMENTS: Baselined launch date of 1/17/02 on 11/15/00. Postponed launch date to 1/28/02 on 5/4/01 and Postponed launch date to 3/21/02 on 10/4/01. Postponed launch date to 4/4/02 on 1/10/02 due to ground processing delays requiring OMS Pod removal. LAUNCH SCRUBS: Scrubbed 4/4/02 Launch at approximately L-8 hours, during ET Fill operations, due to a Hydrogen leak in the MLP 3 Hydrogen Vent Line which is fed by Orbiter Hi-Point Bleed line. The leak was found to be from a 1/8 in wide crack in a weld location in the 16-inch double walled aluminum line. Weld is more than 20 years old. Decision was made to repair using a clam-shell technique. New launch date was set for Monday, 4/8/02. Line was repaired using a two-piece clam-shell that was welded to the 16-inch outer line. |
| VIA AD ASTRA | STS-103) P663/R184/V137/M161 | 2 ENG TAL (BEN): 2:29 2:37 NEG RETURN: 3:53 4:02 PTA (U/S 160): 4:46 5:02 PTM (U/S 160): 6:02 6:20 SE TAL (ZZA) 104: 6:00 6:02 SE PTM (U/S 675): 6:51 6:53 | T09:16:27:00Z BRK INIT: 75 KGS DRAG CHUTE JETTISON: 54 KGS 109:16:27:42Z BRK DECEL FPS ² : AVE 4.4 PK 5.5 WHEELS STOP: 109:16:28:08Z 12677 FT ROLLOUT: 9619 FT 70 SEC WINDS: 0T, 8R OFFICIAL: 08008P11 SS: 3T, 8R PK: 4T, 10R Continued | WEIGHT: 201463 LBS X CG: 1087.17 | 2, operate russ from | d by O | 2002) choa & Bursch s to temp locat | | PAYLOADS: PLB: ISS 8A S0 Truss and ITS | LAUNCH WINDOW: - The Launch Window opened at 98:20:34:32Z and closed at 98:20:44:30Z for a total window of 9M58S. Using a Preferred Launch Time (In-Plane Time) of 98:20:39:31Z, the Launch Window was 4M59S. LAUNCH DELAYS: - Day-of-Launch Delay was 4M48S. LPS system detected consecutive sync errors in all three Stand-by PCM FEP'S (OI, GPC, PLD). The count was held at T-5 Min for 4M48S to execute Front End Processor resynchronization procedure which was successfully completed. Came out of the T-5 Min hold, and picked up the count at 98:20:39:19Z (4:39:19 PM EDT) with 5M11S remaining to Launch Window closure. Launch occurred at 98:20:44:19Z, 4:44:19 PM EDT, on Monday, April 8, 2002. Only 11 seconds remained in the Launch Window at Liftoff. TAL WX: - Zaragoza (Prime and Selected) was Forecast and Observed GO. Moron was Forecast and Observed NO GO for Showers within 20 nm. Ben Guerir was Forecast GO but Observed NO GO for precipitation within 20 nm. PERFORMANCE ENHANCEMENTS: - Standard Set plus: (1) PE Operational High Q TRN/APR, (2). OMS Assist, (3) 52 NM MECO, (4) Del Psi Continued |

SRB

RSRM

AND

ET

INC

SSME-TL

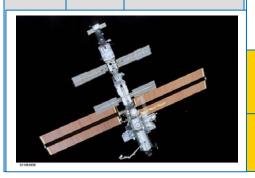
NOM-ABORT

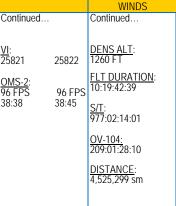
THROTTLE

PROFILE

EMERG

| FLT | ORBITER | CREW (7) | |
|---------------------------------|---------|---|--|
| NO. | | TITLE, NAMES & EVA'S | |
| STS-110/ ISS 8A Continued | | Continued SS EVA 76 DOCKED QUEST EVA 2 SCHEDULED EVA 70 EMU/TETHERED EVA 69 DURATION 7:48 SS EVA 77 DOCKED QUEST EVA 3 SCHEDULED EVA 71 EMU/TETHERED EVA 70 DURATION 7:30 SS EVA 78 DOCKED QUEST EVA 4 SCHEDULED EVA 72 EMU/TETHERED EVA 72 EMU/TETHERED EVA 71 DURATION 6:27 SS EVA 79 DOCKED QUEST EVA 5 SCHEDULED EVA 73 EMU/TETHERED EVA 72 DURATION 6:37 MCC WHITE FCR (39) FLIGHT DIRECTORS: FIt & ISS Ld/O2 - R. E. Castle ISS PLNG - N. D. Knight STS LD/O 1 - J. M. Hanley O 2 - P. F. Dye O 3/PLNG - J. S. Stich A/E - L. E. Cain MOD - J. M. Heflin | |





LAUNCH SITE,

LIFTOFF TIME.

LANDING SITES.

ABORT TIMES

LANDING SITE/

RUNWAY,

CROSSRANGE

LANDING TIMES

FLT DURATION,



ORBIT

HA/HP

ABOVE: STS110-718-013 (13 April 2002) ---Morin anchored on Canadarm2 (& Ross, not shown) worked in tandem on S0 Truss during EVA 2.

LEFT: STS110-E-5926 (17 April 2002) --- New ISS configuration as viewed from departing

ABOVE: STS110-E-5732 --- STS-110 & Exp 4 crews in ISS Destiny Lab. From the left (front row): Ellen Ochoa/MS, CDR Bloomfield, & Exp 4 CDR Yury I. Onufrienko. From the left (middle row): Daniel W. Bursch Exp 4/FE. Walheim/MS. & Carl E. Walz, Exp 4/FE. From the left (back row): PLT Frick, Ross/MS, Morin/MS, & Smith/MS.

SIGNIFICANT ANOMALIES: - Pre-Launch Scrub of 4/4/02 Launch due to Hydrogen Leak

in MLP-3 16-inch Hydrogen Vent Line.
- Sync errors on LPS RF TLM FEP reload required at L-5M11S (Launched occurred with 11 seconds in window.)

- MED'S IDP-2 MSU BITE and FCW Buffer Overflow Error - Primary RCS Thruster L1A Failed Off and was auto-deselected (Chamber P Max 20 psia)

- Low Chamber Pressure on Primary RCS Thruster

F1D (Pc = 63-65 psia)- Low Chamber Pressure on Primary RCS Thruster

F3L (Pc = 63-65 psia)- Lack of Digital Video from PD100 Camcoder to DTV MUX - ICOM Problem with BPSMU

-ODS Upper Hatch Delta Pressure Gauge Bias

Loss of Biomed Data during EVA 2

- Payload Bay Flood Light Făilure

- Problems with Proshare Audio and Video during PMC

Window 2 impact

Continued...

PAYLOAD

WEIGHTS.

PAYLOADS/

EXPERIMENTS

FSW

RENDEZVOUS #58:
- Rendezvous and Dock with ISS to PMA 2 Lab Fwd Port.

MISSION HIGHLIGHTS

(LAUNCH SCRUBS/DELAYS.

TAL WEATHER, ASCENT I-LOADS

FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

First flight with all three Block II SSME's.

First flight of FSW OI-29.

First operation availability of delayed TAL.

EVENTS:
-MC-4 Maneuver at 100:15:04:09, 1:18:19:50, Delta V 2 fps, resultant altitude 204.0 by 211.3 nm.
-ISS Capture at 01/19:20:09 MET, 100:16:04:28Z

ISS Hard Dock at 1/19:34:46 MET, 100:16:19:05Z.

EVENTS (Continued):
- EVA 1 Start at 2:17:52 MET, 101:14:36Z, duration 7H48M. Installed Port & Stbd Fwd Struts to S0 truss and Port & Stbd avionics trays, deployed aft Umbilical tray, and installed TUS-1

EVA 2 Start at 4:17:25 MET, 103:14:09Z, duration 7H30M. Installed Aft Port & Stbd Struts, installed TUS-2 cables, installed A/L handrail, Mated MT/MBS feed through cable. Reboost 1 at 5:01:59 MET, 103:22:44Z, Delta V 3.2 fps, alt.

increase 0.95 nm, orbit 212 x 205 nm.

 EVA 3 Start at 5:17:04 MET, 104:13:48Z, duration 6H27M. Installed J300/400 panels, released capture claw, installed CID's 7 & 8, removed MT Launch restraints. 'Removed MT RPCM Thermal cover.

Reboost 2 at 6:01:00 MET, 104:21:44Z, Delta V 3.4 fps, alt.

increase 1.0 nm, orbit 212 x 206 nm. - EVA 4 Start at 7:17:45:17 MET, 106:14:29:36Z, duration 6H37M. Installed Node & U.S. Lab EVA lights, released LCA guides, S0 handrails, MT energy absorbers, and deployed A/L spur & EV-CPDS.

Sput & LV-US.
- Reboost 3 at 8:14:35:01 MET, 107:11:19:20Z, Delta V 12.8 fps, alt. increase orbit to 213.8 by206.3 nm.
- Cargo transferred to ISS = 28944 lbs (S0 ITS 26716, middeck

2228); ISS to Atlantis middeck 2607 lbs.

- Transfers to ISS: O_2 146 lb, N_2 45 lb, and water 1465 lb (1397 lb in 14 CWC's +68 lbs in three PWR's)

Total transfers to ISS = 30600 lbs, net transfer 27993 lbs (30600 minus 2607)

Hatch close between ISS and Atlantis at 107:16:04Z, 11:04 AM

CDT, Wednesday, 4/17/02 - Undocked at 107:18:31Z, 8:21:47 MET, 1:31 AM CDT, 4/17/02

ISS Visitor Time is 7:02:12:30.

Jerry Ross total EVA time is U.S. record of 58H18m.

FLIGHT DURATION CHANGES: NONE
- Planned Landing at KSC on orbit 171. MLGTD on orbit 171 at KSC runway 33 at 109:16:26:58Z, 4:26:58 PM EDT, 10:19:42:39

| | | CREW | LAUNCH SITE, | LANDING SITE/ RUNWAY, | SSME-TL NOM-ABORT | SRB | ORBIT | | | PAYLOAD | MISSION HIGHLIGHTS |
|---|--|---|--|--|---|---|---------------|--|------|---|--|
| FLT | ORBITER | 7 UP/7 DOWN | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-111/ ISS UF-2 SEQ FLT #110 KSC-110 PAD 39A-62 MLP-1 14TH SHUTTLE FLIGHT TO ISS | OV-105 (Flight 18) Endeavour OMS PODS: LPO4-25 RPO1-32 FRC5-18 | CDR: Kenneth D. Cockrell (Flt 5 - STS-56, STS-69, STS-80, STS-98) P664/R159/V121/M140 PLT: Paul S. Lockhart P665/R279/M245 M/S 1/EV2: Philippe Perrin (France - CNES) P666/R280/M246 M/S 2/EV1: Franklin R. Chang-Diaz (Flt 7 - STS 61-C, STS-34, STS-46, STS-60, STS-75, STS-91) P667/R89/V46/M81 M/S 3 UP/EXP 5 Flt Eng: Peggy A. Whitson P668/R281/F35 M/S 4 UP/EXP 5 CDR: Valery C. Korzun (Russia) P669/R282/M247 M/S 5 UP/EXP 5 Flt Eng: Sergei Y. Treschev (Russia) P670/R283/M248 M/S 3 DN/EXP 4 Flt Eng Carl Walz (Flt 4 - STS-51, STS-65, STS-79, STS-108 Up) P671/R170/V106/M148 M/S 4 DN/EXP 4 Flt Eng: | 6/5/02 (10) LAUNCH WINDOW: 4M39S PLT (In-Plane Time) ISS Planar/Phase EOM PLS: KSC TAL: ZZA TAL WX: MRN, BEN SELECTED: RTLS: KSC 33/N/SFD TAL: MRN 20/N/N AOA: KSC 15/CI/N PLS: EDW 22/N/N TDEL: 0.12 -0.058/-0.20 MAX Q NAV: 722 SRB STG: 2:04 2:05 PERF: NOMINAL 2 ENG TAL (MRN): 2:24 2:29 NEG RETURN: | WINDS EDW 22, CONC EDW 49, CONC 30 170:17:57:42Z 10:57:42 AM PDT Wednesday 14 6/19/02 (6) DEORBIT BURN: 170:16:50:26Z XRANGE: 603 NM ORBIT DIR: AL 31 AIM PT: NOMINAL MLGTD: 3058 FT 170:17:57:42Z VEL: 197 KGS 193 KEAS HDOT: -2.2 FPS TD NORM 195: 3070 FT NLGTD: 6353 FT 170:17:57:53Z VEL: 146 KGS 137 KEAS HDOT: -5.9 FPS DRAG CHUTE DEPLOY: 186 KEAS 170:17:57:45Z BRK INIT: 75 KGS DRAG CHUTE JETTISON: 54 KGS 170:17:58:23Z BRK DECEL FPS ² : AVE 4.4 PK 5.5 WHEELS STOP: 170:17:58:46Z 12677 FT | ENG. S.N. 104/104/ 109% PREDICTED: 100/104.5/ 104.5/72/ 104.5 ACTUAL: 100/104.5/ 98/72/104.5 1 = 2050 (3) 2 = 2044 (7) 3 = 2054 (4) ALL BLOCK II SSME'S M 3 EOM: WEIGHT: 220334 LBS X CG: 1083.62 LANDING: WEIGHT: 220279 LBS X CG: 1085.30 | BI-113 RSRM 84 ET-113 SLWT-19 ET IMPACT 1:13:47 MET LAT: 37.3°S LONG: 160.1°W | 51.60 (14) | DIRECT INSERTION POST OMS-2: 126.7 X 84.8 NM DEORBIT: HA 210.5 HP 187.1 ENTRY VELOCITY: 25902 FPS ENTRY RANGE: 4360 NM | (2) | PERFORMANCE MARGINS (LBS): FPR: 3065 FUEL BIAS: 937 FINAL TDDP: 2484 RECON: 1870 PAYLOADS: PLB: ISS UF-2 (MPLM, MBS, | Brief Mission Summary: The STS-111/UF 2 (14th ISS mission) provided a new crew to the ISS, transfer of supplies and equipment via the Leonardo MPLM, and three EVA's for ISS assembly. The Shuttle RMS was used to successfully install the Mobile Remote Service Base System to the Mobile Transporter on the Destiny Lab. This allows the Canadarm2 to travel the length of the ISS for future construction tasks. KSC WID: OPF 92, VAB 7, PAD 33 = 132 days total. LAUNCH POSTPONEMENTS: - Launch was scheduled for 5/2/02 Postponed launch to 5/31/02 to the end of a Beta Cutout and allow time to train EVA crew to R&R SSRMS failed Wrist Roll Joint Advanced launch to 5/30/02 after analysis indicated adequate power generation using an ISS Pitch attitude bias. LAUNCH SCRUBS: - Scrubbed Thursday 5/30/02 Launch at L-24M53S due to opaque anvils within 30 nm circle while holding at T-9 minutes. PLT was 7:44:26 PM EDT with a window of 4M9S. Lightning was present throughout a wide area in Florida with occasional strike within 30 nm circle and thunderstorms were forecast. Weather forecast 70 percent chance NO GO for launch due to continuing anvil clouds, lightning, and thunderstorms through Monday, June 3. An upper Low is bringing in moist air from the tropics. Decision was made to hold a tanking MMT on Friday, May 31, where it was decided not to tank. Forecast included thunderstorms, anvil clouds, and chance of hail During the count, the L OME GN2 Regulator leaked and increased the accumulator pressure. Regulator locked up after a test. Went into a 24-hour Scrub turnaround. RTLS and Range Weather Scrub A Tanking MMT was held on Friday, 5/31/02 and a decision was made not to tank due to inclement observed and forecast weather. There was a tanking weather violation with observed lightning within 5 nm. Launch forecast was for attached anvil clouds, thunderstorms, lightning, and precipitation. Tanking, RTLS, and Range Weather Scrub A tentative decision was made to try for a Monday, 6/3 launch but keep an eye on the weather and |
| | WALZ BURGH SON TPELLER | Daniel Bursch (Flt 4 - STS-51, STS-68, STS-77, STS-108 Up) P672/R169/V109/M147 | 5:23 5:24 PTM (U/S 182): 6:11 6:06 SE TAL (ZZA 104): | ROLLOUT: 9619 FT 64 SEC WINDS: 3T, 4R | • | C. | | | | RAMBO 5 CRYO TK SETS 6 GN2 TANKS RMS 67 | reload the GN_2 (and at the same time to run another GN_2 regulator test) with a target of a Monday evening launch. This would allow three launch opportunities based on Range schedule on Monday, Tuesday, and Wednesday. Tentative plans were made for a tanking MMT on Monday. On Friday, the GN_2 was reloaded and the regulator failed the leak test. At a Saturday morning management meeting, it was decided to replace the L OME GN_2 |
| Sign ROTATI | ON + RESUPPO | | 6:03 6:06 <u>VI</u> : 25821 25815 | 35005p08 SS: H3, R4 PK: H5, R6 DENS ALT: 1260 FT | approache | | | 002) Endeav | vour | RMS USED FOR ISS MPLM DEPLOY AND RETRIEVE AND EVA SUPPORT | Regulator, and with success oriented schedule, it would lead to a launch date of NET Tuesday 6/4/02. On Sunday morning, management decided to re-target the launch date to Wednesday, 6/5 due to delays in completing GSE work. Wednesday launch was confirmed later. Technical Scrub. Continued |
| | | Continued | Continued | Continued | supplies. | | | | | | |

| | | | | LANDING OFF | 00115 71 | | | | | | |
|-----------|------------|--|------------------------------|------------------------------|--------------|------------|-------------|--|----------|-----------------|---|
| | | CREW | LAUNCHICITE | LANDING SITE/ | SSME-TL | CDD | 0.5 | DIT | | DAVLOAD | MICCION LIICHI ICHTC |
| EL T | ODDITED | 7 UP/7 DOWN | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | OR | BIT | FOW | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | 114 // 15 | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| CTC 111/ | | Continued | Continued | WINDS Continued | ENG. S.N. | | | | | | Continued |
| STS-111/ | | Continueu | Continueu | Continueu | | | | | | | Continued |
| ISS UF-2 | | M/S 5 DN/EXP 4 CDR: | | | | | | | | | LAUNCH WINDOW: |
| Continued | | Yury I. Onufrienko | OMS-2: 38:42 38:45 | FLT DURATION: | | | | - E11/2 | | | - The June 4, 2002 launch window opened at 156:21:18:19Z and |
| Continucu | | (Russia) | 38:42 38:45 98 FPS 95 FPS | 13:20:34:53 | 1 | | | The second | | | Closed at 156:21:27:282 giving a total window of 9Mi095. Using a |
| | | | 98 FPS 95 FPS | S/T: | | | | | 18 | STREET WAS | The June 4, 2002 launch window opened at 156:21:18:19Z and closed at 156:21:27:28Z giving a total window of 9M09S. Using a Preferred Launch Time of 156:21:22:49Z (5:22:49 PM EDT), the window was 4M39S. |
| | | P673/R273/R239 | | <u>S/T</u> : 990:22:48:54 | A | | | The state of the s | | | |
| | | SS EVA 80 | | 01/105 | | | | Made | | W 53 | LAUNCH DELAYS: NONE - Launch occurred On-Time at 156:21:22:49Z (5:22:49 PM EDT) |
| | | DOCKED QUEST EVA 6 | | OV-105: 192:19:24:40 | VA | #1 (C) | à E | | - | | on Wednesday, June 5, 2002. |
| | | EMU/TETHERED EVA 73 | | | | | 10-2 | 4 | KER | | · · · · · · · · · · · · · · · · · · · |
| | | SCHEDULED EVA 74 DURATION 7:14 | | DISTANCE: 5,781,115 sm | | | | Nack) | | | TAL WX: |
| | | DOKATION 7.14 | | 5,781,115 Sm | | 1 | Jel Mal | | | | - Zaragoza (Prime) was forecast and observed NO GO for precipitation. Ben Guerir was forecast and observed NO GO for Head Winds of 27 Knots. Moron (Selected) was forecast and |
| | | SS EVA 81 | | | | 20 | | | | | Head Winds of 27 Knots. Moron (Selected) was forecast and |
| | | DOCKED QUEST EVA 7 | | | | | | 3 | 1 | The state of | observed GO. |
| | | EMU/TETHERED EVA 74 SCHEDULED EVA 75 | | | | | * | 1 | | TO COM | PERFORMANCE ENHANCEMENTS: |
| | | DURATION 5:00 | | | | | | SAL | | | - Standard Set plus: (1) PE Operational High Q TRN/MAY, (2). OMS Assist, (3) 52 NM MECO, (4) Del Psi |
| | | | | | ISS004-E-1 | 3426 | Evn 4 (dar | k blue chirte | 212 (- | -111 (green | OMS Assist, (3) 52 NM MECO, (4) Del Psi |
| | | SS EVA 82 | | | | | | | | ISS Destiny | FLIGHT DURATION CHANGES: |
| | | DOCKED QUEST EVA 8 EMU/TETHERED EVA 75 | | | Lab. Exp 4 | crew fro | m front to | back, CDR | Onufri | enko (RSA), | - Total Extensions: 2 Days Plus 2 Revs. Planned landing at |
| | | SCHEDULED EVA 76 | | | Bursch/FE. | & Walz/F | E. STS-11 | 1 crew. from | m front | to back, CDR | KSC on Orbit 186 at 12:59 PM ED1 on June 17, 2002. Did not |
| | | DURATION 7:17 | | | Cockrell, Cl | hang-Dia: | z/MS, PLT | Lockhart, | & Perrii | n/MS (CNES). | off Orbit 186 due to forecast ceiling, precipitation, crosswinds, |
| OHWAD | | | | | Exp 5 crew | , from fro | nt to back, | CDR Korzu | ın (RSA | A), Whitson/FE, | and thunderstorms and observed precipitation, thunderstorms |
| OH JUP | AL PARTIES | MCC WHITE FCR (40) | | | & Treschev | /FE (RSA | ۸). | | | | Within 20 nm, ceiling 2600 broken and visibility violations. Waved |
| | 1 | WOO WHITE FOR (40) | market Market | | | | 1000 | - Control | | | FLIGHT DURATION CHANGES: - Total Extensions: 2 Days Plus 2 Revs. Planned landing at KSC on Orbit 186 at 12:59 PM EDT on June 17, 2002. Did not call up EDW. Closed PLBD's but did not fluid load crew. Waved off Orbit 186 due to forecast ceiling, precipitation, crosswinds, and thunderstorms and observed precipitation, thunderstorms within 20 nm, ceiling 2600 broken and visibility violations. Waved off landing at KSC on Orbit 187 with similar forecast and observed at landing time. Extended one day. Brought up EDW for EOM+1. Waved off landing at KSC on Orbit 201 due to forecast ceiling, precipitation, and thunderstorms. Observed ceiling, precipitation, thunderstorms, and visibility violations. Waved off Orbit 202 due to similar forecasts and observations. Extended the second day. |
| | | FLIGHT DIRECTORS: | | | | | | | | | for EOM+1. Waved off landing at KSC on Orbit 201 due to |
| | | ISS Ld/O1-R. E. LaBrode | | / 5 | | | | | | * | forecast ceiling, precipitation, and thunderstorms. Observed |
| | | ISS O 2 - J. M. Curry ISS PLNG - B. C. Lunney | | | la de | | | | | | Waved off Orbit 202 due to similar forecasts and observations. |
| | | STS LD/O 1 - P. S. Hill | | | A | | | | | | Extended the second day. |
| | | STS O 2 - A. J. Ceccacci | | / | | 4 | | | | | - EOM+2 was "pick the landing site" day. EOM-2 PLBD's were |
| | | STS O 3/PLNG - K. B. Beck | | | | | | REFERENCE | | | Waved off Orbit 202 due to similar forecasts and observations. Extended the second day. - EOM+2 was "pick the landing site" day. EOM-2 PLBD's were closed for Planned landing at KSC on Orbit 216 at 170:14:52Z. Crew not in suits and no fluid load. Waved off landing at KSC on Orbit 216 at approximately Tig -40 minutes due to forecast and observed thunderstorms, attached anvii clouds, and low ceiling within 30 nm. Waved off landing at KSC on Orbit 217 at approximately Tig -20 minutes due to thunderstorms, attached anviis, and low clouds. (Two orbits wave-off). - Decision made to land at EDW 22 on Orbit 218. MLGTD at 170:17:57:407. 10:57:42 AM PDT (MFT 13:20:34:57) on |
| | | A/E - J. P. Shannon | | | | 75 | | | | | Orbit 216 at approximately Tig -40 minutes due to forecast and |
| | | MOD - R. E. Castle | | | | | | 26 | | - | observed thunderstorms, attached anvil clouds, and low ceiling |
| | | | | | | | | | 1 | Rosenson | WITHIN 30 NM. Waved Off landing at KSC on Orbit 217 at |
| | | | | | | | | | 5 66 | | anvils, and low clouds. (Two orbits wave-off). |
| | | | | | | 6 5 | | 1 | | 1 | - Decision made to land at EDW 22 on Orbit 218. MLGTD at |
| | | | 1 | | | | | Water Comment | 1 | | 170:17:57:42Z, 10:57:42 AM PDT (MET 13:20:34:57) on Wednesday, June 19, 2002. |
| | | | | | | | | | | | I- NI GTD at 170:17:57:537 |
| * | m m | | Market State | | | 13 | | | 1 | | - Total Flight Duration Extensions: Two Days plus two orbits. |
| 1 | | | | | 11/100 | 8 | 1 | | | | - |
| 100 T | | | 1/4/200 | | | | | | | EXP 4 CDR | FIRSTS: |
| N KOD | HVC | | 11000 | | . 111 | On | ufrienko (R | ussia) gree | ts EXP | 5 CDR | - First use of orbiter oxygen for EVA pre-breathe for astronauts in ISS Joint Airlock. |
| ,.OP | 31 | | | | 1/1 | Kor | rzun (Russ | ia, back to | camera |) with STS-111 | 100 John Alliock. |
| | | | S111E5095 | | | CD | R Cockrell | partially vis | sible at | right. | Continued |

| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
|-----|---------|--------------|----------------|---------------|-----------|------|-----|-------|-----|-------------|--------------------------------------|
| | | 7 UP/7 DOWN | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | 7 OP/7 DOWN | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | αLVAS | | WINDS | ENG. S.N. | | | | | | |

STS-111/ ISS UF-2

Continued.



STS111-E-5238 (11 June 2002) --- Perrin/MS1 (France) installs the Mobile Remote Servicer Base System (MBS) on the ISS



JSC2002-E-23106 --- J. Milton (Milt) Heflin (standing), Chief, Flight Director's Office, along with Dan Carpenter (background), Director, Public Affairs Office, and Rob Navias, lead STS-111 PAO commentator, discuss mission in JSC MCC WFCR



JSC2002-E-23100 --- Flight Directors Steve Stich (right foreground) and John Shannon; along with astronauts William A. Oefelein and Kenneth T. Ham, spacecraft communicators (CAPCOM), watch the large MOCR screens.

Continued...

- MC4 Maneuver Start at 158:15:16:16Z, 1:127:53:27 MET, 1.2 t/sec, altitude 203.3 by 211.9 nm.
- ISS Capture at 158:16:24Z, 1:19:01 MET. ISS Hard-Docked at 158:17:26:32Z, 1:20:03:43 MET Official Transfer Time (IELK time) from Expedition 4 Crew to Expedition 5 Crew = 158:22:55Z, 5:55 PM CDT, June 7, 2001.
- Expedition 4 ISS Habitant Time is 181:00:43.
- MPLM installed on Node 1 by RMS at 159:14:28Z, 2:17:05 MET EVA 1 Start at 160:15:26Z, 3:18:03 MET and End 160:22:40Z, 04:01:17 MET, duration 7:14. Installed PDGF on P6 Truss, mated heater cables from MBS to MT, and installed SM debris protectors on PMA1 for future installation on SM.
- Photographed failed ISS CMG-1.
- Reboost Maneuver 1 Start at 161:20:53:24Z, 4:23:30:35 MET, Delta V 3.0 fps, 0.8 nm altitude increase, altitude 212 by 205 nm. EVA 2 Start at 162:15:19Z, 5:17:58 MET and End 162:20:19Z, 5:22:58 MET, duration 5:00, final installation of MBS to MT (Connected video and data cables), attached bag with contingency extension cable to MBS.
- Reboost Maneuver 2 Start at 163:12:08:02Z, 6:15:45:13 MET, Delta V 3.0 fps, altitude increase .81 nm, Orbit 212.8 by 206.2 nm
- EVA 3 Start at 164:15:16Z, 7:17:53 MET, duration 7:17. R&R SSRMS Wrist Roll Joint (WRJ).
- Reboost Maneuver 3 Start at 165:11:51:26Z, 6:14:28:37 MET, Delta V 12.5 fps, altitude increase 3.6 nm, orbit 214.4 by 211.1
- Transfers from shuttle to ISS = 9512 lbs (from MPLM = 8062 lbs and from middeck = 1450 lbs). Transfers from ISS to Shuttle = 6342 lbs (to MPLM = 4668 lbs and to middeck = 1675 lbs). Consumables transfer: Total water = 884.9 lbm (8 CWC's with 798.9 and 4 PWR's with 86.0 lbm). Total shuttle O2 transferred = 34 lbm for the 3 EVA prebreathes in JAL, N2 tank transfer of 18.9
- Undocked at 166:14:31Z, 9:17:08 MET
- STS-111/ISS Visitor Time is 7:31:04:28 (Docking to Undocking) Expedition 4 ISS Habitant Time is 181:00:43:00 (IELK S/L Xfer to
- IELK S/L Xfer), Expedition 4 broke U.S. Flight Time record, flight time is 195:19:38:14 (STS-108 L/O to STS-111 MLGTD).
 Carl Walz record total flight time is 230:13:02:44. Dan Bursch
- Total Flight Time is 226:22:14:48.
- Sep Burn 166:16:14:27Z, 6:18:51:38 MET.
- Orbit Adjust Maneuver at 166:17:57:48Z, 9:20:34:59 MET, Delta V 45.6 fps, orbit was 186.1 by 211.9 nm.

RENDEZVOUS # 59: Rendezvous and Dock with ISS (Dock to PMA2 Lab Fwd Port)

SIGNIFICANT ANOMALIES:

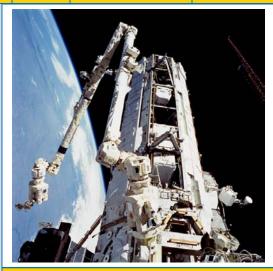
- Right Main Engine High Pressure Fuel Pump Speed Sensor Failure
- Flash Evaporator Controller Primary B failure
 WIF Adapter Hitch Pin Anomaly
 EV2 Boot Fit Problems during EVA 1

- EVA Communications Anomaly on STS-111 EVA 3
- AVIU-Camcorder Failed
- BPSMU XMIT/ICOM Dey causes Video to Flicker LL QUAD Reflected Power Spikes
- Loss of BIOMED Data on EVA 1

| | | | <u> </u> | ACL SIT | | 11110 | ,,, | 110 00 | | 7 11 2 1 | |
|------------------------|----------------------------|--|--|--|--|--------------------------|--------|-----------------------------|----------|------------------------------------|--|
| | | CREW | LAUNIOU OITE | LANDING SITE/ | SSME-TL | CDD | | ODDIT | | DAV4.04D | MICCIONALIICUITO |
| FLT | ORBITER | (6) | LAUNCH SITE, LIFTOFF TIME, | RUNWAY, CROSSRANGE | NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | URDITER | | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | F3W | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| NO. | | TITLE, NAMES | ABORT TIMES | FLT DURATION, | PROFILE | ET | IIVC | HAVIIF | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | & EVA'S | ADORT TIMES | WINDS | ENG. S.N. | LI | | | | EXI EKIMENTS | TIKSTS, SIGNII IOANT ANOMALIES, ETC.) |
| STS-112/ | OV-104 | CDR: | KSC 39B | KSC 33 (KSC 60) | 104/104/ | BI-115 | 51.60 | DIRECT | OI-29 | CARGO: | Brief Mission Summary: The STS-112/9A (15th ISS mission) |
| ISS 9A | (Flight 26) | Jeffrey S. Ashby | 280:19:45:51Z | 291:15:43:41Z | 109% | DODIA | (15) | INSERTION | (3) | 37441 LBS | delivered the 45-foot long, 15 ton S1 Truss for further |
| | Atlantis | (Flt 3 - STS-93, STS-100) P674/R251/V169/M218 | 3:45:51 PM EDT (P) 3:45:51 PM EDT (A) | 11:43:41 AM EDT | PREDICTED: | RSRM 87 | | DUST UMS 3. | | <u>PAYLOAD</u> | assembly of ISS. The S1 Truss was attached to the |
| SEQ | Allantis | 1 074/11231/ 1 107/11/12 10 | Monday (13) | Friday 13 | 100/104.5/104.5/ | 07 | | POST OMS-2: 126.4 x 85.0 | | CHARGEABLE: | starboard side of the Center S0 Truss allowing for the |
| FLT #111 | | PLT: | 10/7/02 (11) | 10/18/02 (9) | 72/104.5 | ET-115 | | NM | | 29502 LBS | outboard expansion of the rail system to prepare for future |
| KSC-111 | OMS PODS: LPO3-30 | Pamela A. Melroy | L ALINICI LIMINIDOM | DEODDIT DUDN | ACTUAL | SLWT-20 | | | | DEDLOVED. | ISS growth. This truss also contains a new cooling system, S-band Comm, and the first Thermal Radiator Rotary Joint |
| | RPO4-26 | (Flt 2 - STS-92) P675/R261/V175/F34 | LAUNCH WINDOW: 4M59S USING PLT | <u>DEORBIT BURN</u> : 291:14:36:14Z | ACTUAL: 100/104.5/97/ | SLW1-20 | | | | <u>DEPLOYED</u> : 29543 LBS | (TRRJ). |
| PAD 39B-49 | FRC4-26 | 1 0/3/1(201/ 1/3/1 34 | (ISS IN-PLANE | | 72/104.5 | | | | | 27343 LD3 | (TKKJ). |
| 39B-49 | | M/S 1/EV1: | ŤIME) | XRANGE: 21 NM | | | | | | NON-DEPLOYED: | KSC W/D: OPF 106, VAB 6, PAD 25 = 139 days total. |
| | | David A. Wolf (Flt 3 - STS-58, Up to Mir | EOM PLS: KSC | ORBIT DIR: AR 12 | 1 = 2048 (5) 2 = 2051 (4) | | | | | 0 LBS | |
| MLP-3 | | on STS-86, Dn on STS-89) | TAL: ZZA | AIM PT: NOMINAL | 3 = 2047 (8) | | | | | MIDDECK: | LAUNCH POSTPONEMENTS: |
| 15TH | | P676/R173/V147/M151 | TAL WX: MRN | | 2017 (0) | | | | | 382 LBS | - Launch was postponed from June after Post-STS-110 visual inspections of OV-104 Inconel 12" MPS LH ₂ Flowliners revealed |
| SHUTTLE | | M/C 2 | | MLGTD: 3072 FT 291:15:43:41Z | | | | | | CULITTLE | three cracks to SSME 2. Subsequent inspections found cracks in |
| FLIGHT | | M/S 2: Sandra H. Magnus | SELECTED: RTLS: KSC 33/N/N | VEL: 186 KGS | M 3 EOM: | FT | | DEORBIT: | | <u>SHUTTLE</u> ACCUMULATED | other Orbiter LH ₂ Flowliners: |
| TO ISS | | P677/R284/F36 | TAL: ZZA 30/N/SFD | 187 KEAS HDOT: -1.0 FPS | | MPACT | | HA 220.0 NM | | WEIGHTS: | - OV-103 - three cracks (SSME 1) - OV-105 - one crack (SSME 1) and one crack (SSME 2) |
| MCC WHIT | E FCR (41) | | AOA: KSC 33/N/N | | WEIGHT: | | | HP 146.0 NM | | DEPLOYED: | - MPTA - one crack (SSMF 1) |
| FLICHT DI | DECTORC: | M/S 3/EV2: Piers J. Sellers | PLS: EDW 04/N/N | TD NORM 195: 2851 FT | 202688 LBS | 1:14:01 MET | | VELOCITY: | | 1160050 LBS NON-DEPLOYED: | - OV-102 three cracks (SSME 2). OV-102 flowliners are CRES. |
| FLIGHT DII | RECTORS: - A. F. Algate | P678/R285/M249 | TDEL: | | X CG: | IVIEI | | 25917 FPS | | 1534904 LBS | After analyses, tests, etc., including consideration of other repair |
| ISS O 2 - N | Л. A. Kirasich | | -0.11 -0.368/-0.490 | NLGTD: 5475 FT 291:15:43:48Z | 1087.08 | LAT: | | | | CARGO TOTAL: | techniques, the decision was made to use weld-repair technique and polishing of Flowliner holes. |
| ISS PLNG | - A. P. | M/S 4: | MANY O MANY | VEL: 161 KGS | | 36.97°S | | ENTRY | | 3473352 LBS | - Severe cracks were found in Mobile Launch Platform Crawler- |
| Hasbrook STS LD/O | 1 D I | Fyodor N. Yurchikhin (Russia) | MAX Q NAV: 726 725 | 160 KEAS | LANDING: | I ONG: | | RANGE: 4342 NM | | PERFORMANCE | Transporter (CT-2) jacking cylinder bearings. CT-2 was repaired |
| Engelauf | 1 - 1 . L. | P679/R286/M250 | 720 723 | HDOT: -6.2 FPS | | <u>LONG</u> : 159.3°W | | TOTE INIVI | | MARGINS (LBS): | using undamaged spare and new bearings. CT-2 bearings will be replaced incrementally. |
| STŠ O 2 - (| C. A. Koerner | | SRB STG: | DRAG CHUTE | WEIGHT: | | | | | FPR: 3065 | - These postponements resulted in rescheduling STS-112 and |
| STS O 3/PI | _NG - J. M. | SS EVA 83 | 2:04 2:02 | DEPLOY: 157 KEAS 291:15:43:51Z | 202621 LBS | | | | | FUEL BIAS: 937 FINAL TDDP: 2744 | STS-113 ahead of STS-107. STS-112 launch date was set to |
| Curry A/E - J. P. S | Shannon | DOCKED QUEST EVA 9 | PERF: NOMINAL | | X CG: | | | | | RECON: 3860 | October 2, 2002. |
| MOD - R. E | | EMU/TETHERED EVA 76 | | BRK INIT: 86 KGS | 1088.94 | | | | | | LAUNCH SCRUBS: |
| | | SCHEDULED EVA 77 | 2 ENG TAL (MRN): 2:33 2:30 | DRAG CHUTE JETTISON: | | | | | | PAYLOADS: | - Scrubbed October 2 Launch at approximately L-27 hours at an |
| Bt 31 | S-112 ME | DURATION 7:01 | 2:33 2:30 | 51 KGS | | | | | | PLB: ISS 9A | MMT due to the threat to JSC/MCC posed by Hurricane Lili in the |
| (3) | ¥ 60 | SS EVA 84 | NEG RETURN: | 291:15:44:18Z | | | | | | (ITS S1 TRUSS) | Gulf of Mexico. Launch delayed for at least 24 hours. At approximately L-21 hours, the Space Shuttle and ISS Programs |
| | | DOCKED QUEST EVA 10 | 3:54 3:54 | BRK DECEL FPS ² : | | | 12/4 | 1 | | CETA CART A | decided there was less risk to the MCC by implementing an |
| | 1 1 | EMU/TETHERED EVA 77 SCHEDULED EVA 78 | PTA (U/S 182): | AVE 6.9 PK 9.1 | | | | 1 | 4 | RMS, ODS | orderly powerdown of the MCC with a launch in the |
| | ⊚ | DURATION 6:04 | 4:57 4:55 | WHEELS STOP: | | | A. | | | | Sundáy/Monday timeframe. Weather Scrub Early Wednesday morning, October 2, MCC-H transitioned |
| | 9A S | | | 291:15:44:33Z | 0.645 | 18 34 | 1 | 100 | | MIDDECK: | USOS operations support to BCC HSG Moscow |
| E.C. | | SS EVA 85 | PTM (U/S 182): | 11377 FT | | | 419 | | - + | ICC OA | USOS operations support to BCC HSG Moscow. - At the October 2, 6:45 AM CST MMT, the decision was made |
| У ЮР | чихин 🥳 | DOCKED QUEST EVA 11 EMU/TETHERED EVA 78 | 6:14 6:10 | ROLLOUT: | | 1 | 4.7 | | | ISS 9A (SHIMMER, | Inot to launch earlier than Monday, October 7. This presumes a |
| | | SCHEDULED EVA 79 | SE TAL (ZZA): | 8305 FT 52 SEC | | 1/- | 1700 | | The same | RAMBO) | GO to begin Restoration of the MCC late Wednesday or early Thursday. |
| | | DURATION 6:36 | 6:04 6:08 | | THE REAL PROPERTY. | | | | 1 | , | - MCC powerup/restoration began early Thursday morning. |
| | | | MECO CMD: | WINDS: 11H, 5R KTS | THE REAL PROPERTY. | TO SOUR | - | | | 5 CRYO TK SETS | October 3. ISS operations in MCC will be resumed Thursday |
| | FATCS | | 8:21.5 8:24.5 | IOFFICIAL: | 4000000000000000000000000000000000000 | | MAN NO | | | 6 GN2 TANKS RMS 69 | night. Launch scheduled for Monday, October 7. |
| | | | | 01011P17 AVE: 8H 11R | TO THE REAL PROPERTY. | | 45.5 | | 9/2 1 | | |
| (35) | | | <u>VI</u> : | AVE: 8H 11R PK: 13H 11R | STS112_ETG | CΔM typi | cal - | Typical view | | RMS USED FOR | |
| O E | | **/ | 25 822 25815 | | during ascen | | | | | TV SUPPORT DURING S1 | |
| | 5.112 gA | | OMS-2: | DENS ALT: 1019 FT | | | | rtesy MSFC E | Т | INSTALL (SSRMS | Continued |
| 5 | + 155 | | 38:40 38:42 | Cambinus d | Project Office | e) | ,000 | | | INSTALL) | Continued |
| | | | 96.1 FPS 95.9 FPS | Continued | | | _ | | | | |

| FLT | ORBITER | CREW (6) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|----------------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS / EXPERIME NTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |

STS-112/ ISS 9A Continued.



STS112-709-033 (12 October 2002) --- Newly installed Starboard S1 Truss and Canadarm2.

Continued...

FLT DURATION: 10:19:57:50

S/T: 1001:18:46:44

OV-104: 219:21:26:00

DISTANCE: 4,513,01 5 sm



ISS005-E-16524 --- Atlantis on approach to ISS for rendezvous and docking operations to deliver the 15 ton S1 Truss.

BELOW: STS112-331-031 -- The EXP 5 & STS-112 crews in Destiny Lab on ISS. From left, front row EXP 5 crew: Peggy A. Whitson/FE, Valery G. Korzun/CDR(RSA), & Sergei Y. Treschev/FE(RSA). From left, back row STS-112 crew: Wolf/MS, Magnus/MS, Melroy/PLT, Ashby/CDR, Sellers/MS, and Yurchikhin/MS(RSA).



Continued...

LAUNCH WINDOW:

- Launch window opened at 280:19:40:51Z and closed at 280:19:50:50Z for a total launch window of 9m59s. In-plane time was 280:19:45:51Z for a launch window of 4m59s.

LAUNCH DELAYS: NONE

- Launch occurred On-Time at 280:19:45:51Z, 3:45:51 PM EDT on Monday, October 7, 2002.

TAL WX:

- Zaragoza (prime and selected) and Moron (2-Eng TAL Call) were forecast and observed GO. Moron earlier forecast was NO GO for showers and anvils. Ben Guerir was not available.

PERFORMANCE ENHANCEMENTS:
- Standard Set plus: (1) PE Operational High Q TRN/OCT, (2) OMS Assist, (3) 52 NM MECO, (4) Del Psi

FLIGHT DURATION CHANGES: NONE
- Planned landing at KSC on Orbit 171. MLGTD at KSC Runway 33 on
Orbit 171 at 291:15:43:41Z, 11:43:41 AM EDT, 10:19:57:50 MET. NLGTD at 291:15:43:48Z, 11:43:48 AM EDT. STS-112 was the 75th planned landing at KSC, but the 60th actual landing at KSC, and the 36th landing on Runway 33.

FIRSTS/LASTS:
- First use of ET Shuttle Observation Camera during ascent.

- <u>EVENTS:</u>
 MC4 Start at 282:14:18:46Z, 3.2 fps, orbit 200.4 by 213.6 nm.
- ISS Capture at MET 1:19:30:19, 282:15:16:10Z.
- Hard dock to PMA2 Lab Fwd Port complete at 1:19:44:06 MET, 282:15:29:57Z.
- 282:15:29:57Z.
 PMA/APAS Hatch Open at 282:16:40Z, 1:20:55:09 MET. ODS Hatch open at 282:16:50Z, 1:21:05:09 MET.
 EVA 1 (JAL) Start at 283:15:21Z, 2:19:35 MET End at 283:22:22Z, 3:02:36 MET, duration 7h01m (Attached S1 to S0 Truss using SSRMS. Released CETA cart launch locks. Connected Zenith side power umbilicals and deployed S-Band Antenna. Installed S1 nadir ETVCG).
 First Reboost maneuver start at 285:10:52:48Z, 4:15:06:57 MET, delta V of 11.9 fps, allitude increase of 3.4 nm, orbit 216 by 204 nm.
 EVA 2 (JAL) Start at 285:14:30Z, 4:18:44 MET, End 285:20:34Z, 05:00:48 MET, duration 6h04m. (Installed 71/P6, 71/Lab and RBVM.
- 05:00:48 MET, duration 6h04m. (Installed Z1/P6, Z1/Lab and RBVM SPD's. Connected ATA Umbilicals. Installed Lab ETVCG. ZCG Activation).

Continued...



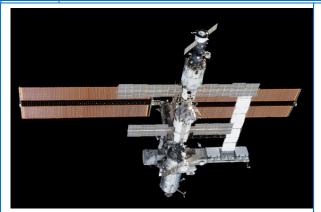


STS112-326-033 --- Wolf (left) & Sellers during 2nd EVA. Wolf is anchored to a foot restraint on ISS's Canadarm2 while Sellers traverses along the airlock spur.

| FLT | ORBITER | CREW (6) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | OR | BIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE FNG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |

STS-112/ ISS 9A

Continued





LEFT: JSC2002-E-41249--STS Lead FD Phil Engelauf in MCC WFCR reviewing Flight Day 2 activities.

Continued...

EVENTS (Continued):

- Second Reboost maneuver (c3) start at 287:11:20:50Z, 6:15:34:59Z MET, delta V = 6.9 fps, altitude increase 1.96 nm, orbit 219.4 by 203.3 nm.

- EVA 3 (JAL) Start at 287:14:11:25Z, 6:18:25:34 MET, End 287:20:47Z, 07:01:01 MET, EVA duration 6h36m. (IUA on MT R&R. S1 to S0 fluid (ammonia) jumper connections, removal of port and starboard keel pins, last of TRRJ SPD's, TRRJ bolts).
- Total cargo transfers from Orbiter to ISS = 29120 lbm (S1 Segment = 27676 lbm), Total cargo transfers from ISS to Orbiter = 1351 lbm Consumables Transfer: H_2O Total = 1658.1 lbm (16 CWC's with 1603.7 lbm and 3 PWR's with 54.4 lbm). Total N2 (Tank) = 68.2 lbm. - Total O₂ = 60 lbm (Pre-Breathe: EVA 1 = 10 lbm, EVA 2 = 10 lbm, EVA 3 =
- 10 lbm. Tank Transfer= 28 lbm).
- Undocking at 289:13:13:25Z, 8:17:27:34 MET.
- Total ISS Visitor Time = 6:21:33:28.
- Post-undocking initial separation maneuver began at 289:13:13Z. ISS lyaround terminated at 289:14:30Z, 8:18:44 MET
- Final Separation at 289:15:00Z, 8:19:14 MET, delta V= 5.5 fps, resulting Orbit = 200.8 nm by 219.9 nm.
- Orbit Adjust Maneuver at 290:20:26:51Z, 10:00:41:00 MET, delta V = 93.9 fps, Orbit 146.6 nm by 219.9 nm
- Note: At 291:08:35Ž, using Progress engines, raised the ISS 6.9 miles.

RENDEZVOUS # 60:
- Rendezvous and Dock with ISS (Dock to PMA2 Lab Fwd Port)

SIGNIFICANT ANOMALIES:

- Piece of debris impacted ETA ring near IEA box on LH SRB at 33 seconds.

 Insulating foam was lost on ET-115 left bipod ramp (approx 4" X 5" X12") exposing bipod housing SLA closeout.
- Primary Thruster L4D failed off due to low chamber pressure (IFA STS-112-
- Panel F7 SM Alert Light Brightness
- Supply Water Crossover Valve Circuit Breaker did not indicate Open
- System A Pyros for SRB Holddown Posts and ET Vent Arm Systems did not fire at T-0 (IFA STS-112-K-01).
- EVA Glove Wrist Tether Point Torn
- RPOP PGSC (STS-5) Network Problem

- Emergency Egress Net Daisy Wheel Knob broke
 PCS 1 O2 Supply Pressure Indication failed OSH
 MADS recorder "stuck" at beginning of tape (tape came off reel)
 Forward RCS Primary Thruster F3F Failed On Heater
- ICOM A from Shuttle to Station not operating
- Handheld Microphone failed

STS112-382-003 (16 October 2002) --- New ISS configuration as viewed from departing Atlantis.



JSC2002-01809 -- Members of MOD Planning Team in JSC MCC shuttle flight control room (WFCR). CAPCOM Stephanie D. Wilson holds the STS-112 mission logo. Flight Director John Curry stands to right of Wilson.



JSC2002-01806 -- STS-112/ISS-9A Orbit 1 Team in the ISS Flight Control Room (BFCR) in JSC MCC. Flight Director Mark Kirasich stands near center on front row. Left of center, ISS SPAN Team Lead Dan Bahadorani holds ISS logo.

| | | | | AOL OIL | | | | | | 7 41 4 1 | |
|--|--|--|---|---|--|--|--------------------------------|------------------------------|------|---|---|
| FLT | ORBITER | CREW 7 UP/7 DOWN | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | ORB | | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | ORDITER | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC H | IA/HP | 1300 | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-113/ ISS 11A SEQ FLT #112 | OV-105 (Flight 19) ENDEAVOUR | P680/R108/V80/M198 | KSC 39A 328:00:49:47Z 7:49:47 PM EST (P) 7:49:47 PM EST (A) Saturday 5 11/23/02 (EST) (14) | KSC 33 (KSC 61) 341:19:37:13Z 2:37:13 PM EST Saturday 21 12/7/02 (14) | 104/104/ 109% PREDICTED: 100/104.5/104.5/ 72/104.5 | BI-114 RSRM 86 ET-116 | | | (4) | CARGO: 38393 LBS PAYLOAD CHARGEABLE: 30217 LBS | Brief Mission Summary: STS-113 was the 16th American assembly mission to the ISS. The primary goals achieved on this mission were to transport the EXP 6 crew to the ISS and return the EXP 5 crew to earth after 5 months in space and to install the Port (P1) Integrated Truss Assembly. The 45-ft long 14-ton P1 truss is the opposite side mate to the |
| KSC-112 PAD 39A-63 MLP-2 | OMS PODS: LPO4-26 RPO1-33 FRC5-19 | PLT: Paul S. Lockhart (Flt 2 - STS-111) P681/R279/V176/M245 M/S 1/EV1: Michael E. Lopez-Alegria | LAUNCH WINDOW: 7M08S IN 2 PANES ISS PLANAR/PHASE | DEORBIT BURN: 341:18:31:33Z XRANGE: 2.1 NM ORBIT DIR: AL 32 | ACTUAL: 100/104.5/99/ 72/104.5 1 = 2050 (4) 2 = 2044 (8) | SLWT-21 <u>ET</u> <u>IMPACT</u> 1:14:10 | DEOF APOC 214 N PERIO | <u>GEE</u> : IM | | <u>DEPLOYED</u> : 29672 LBS <u>NON-DEPLOYED</u> : 46 LBS | Starboard S1 truss delivered on STS-112. It is the 4th of 11 truss structures that ultimately will extend the ISS length to that of a football field. The P1 truss contains the Active Thermal Control System (to be activated later), a second UHF comm system, a second CETA cart, and a Thermal Radiator Rotary Joint (TRRJ). |
| 16TH SHUTTLE | | (Flt 3 - STS-73, STS-92) P682/R202/V163/M175 | TAL: ZZA TAL WX: MRN | AIM PT: NOMINAL | 3 = 2045 (7) | MET | 212 N | IM | | MIDDECK: 288 LBS | KSC W/D: OPF 79, VAB 9, PAD 35 = 123 days total. |
| FLIGHT TO ISS | LOCKHART LOC | M/S 2/EV2: John B. Herrington P683/R287/M251 M/S 3 UP/EXP 6 CDR: Kenneth D. Bowersox (Fit 5 - STS-50, STS-61, STS-73, STS-82) P684/R146/V97/M130 M/S 4 UP/EXP 6 Flt Eng 1: Nikolai Budarin (Russia) P685/R288/M252 M/S 5 UP/EXP 6 Flt Eng 2: Donald R. Pettit P686/R289/M253 M/S 3 DN/EXP 5 Flt Eng 2: Sergei Y. Treschev (Russia) (STS-111 Up) P687/R283/M248 M/S 4 DN/EXP 5 CDR: Valery C. Korzun | SELECTED: RTLS: KSC 33/N/N TAL: ZZA 30/N/SF AOA: KSC 33/N/N PLS: EDW 22/N/N TDEL: 0.04 -0.278/-0.24 MAX Q NAV: 763 765 SRB STG: 2:04.8 2:04 PERF: NOMINAL 2 ENG TAL (BEN): 2:33 2:35 NEG RETURN: 3:52 3:55 PTA (U/S 183): 5:01 PTM (U/S 183): 6:05 6:10 | MLGTD: 2846 FT 341:19:37:13Z VEL: 194 KGS 197 KEAS HDOT: -2.8 FPS TD NORM 195: 3009 FT NLGTD: 5814 FT 341:19:37:23Z VEL: 163 KGS 159 KEAS HDOT: -5.8 FPS DRAG CHUTE DEPLOY: 155 KEAS 341:19:37:25Z BRK INIT: 65 KGS DRAG CHUTE JETTISON: 57 KGS 341:19:38:00Z BRK DECEL FPS ² : AVE 3.9 PK 5.1 WHEELS STOP: 341:19:38:28Z 13420 FT | | LAT: 36.54°S LONG: 158.67°W | 25907 ENTR RANG 4351 | SE: NM | | SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 1189722 LBS NON-DEPLOYED: 1559554 LBS CARGO TOTAL: 3547208 LBS PERFORMANCE MARGINS (LBS): FPR: 3065 FUEL BIAS: 937 FINAL TDDP: 1736 RECON: 2486 PAYLOADS: PLB: ISS 11A (ITS P1 TRUSS) CETA CART B SRMS, ODS MIDDECK: ISS 11A | LAUNCH POSTPONEMENTS: - Launch was postponed from July after Post-STS-110 visual inspections of OV-104 Inconel 12" MPS LH2 Flowliners revealed three cracks to SSME 2. Subsequent inspections found cracks in other orbiter LH2 Flowliners: - OV-103 - three cracks (SSME 1) - OV-105 - one crack (SSME 1) and one crack (SSME 2) - MPTA - one crack (SSME 1) - OV-102 three cracks (SSME 2). OV-102 flowliners are CRES. After analyses, tests, etc., including consideration of other repair techniques, the decision was made to use weld-repair technique and polishing of Flowliner holes. - As a result, STS-113 and STS-112 moved ahead of STS-107. STS-113 launch date was set to November 6, 2002 EST. - At FRR, STS-113 Launch was postponed 1 day to November 7, 2002 EST at 11:56 PM (311:04:56Z). LAUNCH SCRUBS: - Scrubbed Monday, November 7 Launch at approximately L-3 hours due to an O2 leak in PCS 2 between ECLSS Supply Valve and 576 Bulkhead. Leak was first noticed when Haz Gas Detection System indicated an O2 concentration of approximately 150 ppm in the Mid-Body. Troubleshooting procedures isolated the leak to PCS 2 outside the cabin between ECLSS O2 Supply valve and Crew Module 576 bulkhead. Launch date set to NET Monday, November 18. Inspection/troubleshooting found a blowing leak in PCS 2 O ₂ flex hose near the 576 bulkhead. Replaced PCS 2 O ₂ and N2 flex hoses. During preparation to get access to PCS 2 O ₂ line under PLB liner, an Access Platform came in contact with the RMS damaning the TPS. Keylar |
| | | (Russia) (STS-111 Up) P688/R282/M247 M/S 5 DN/EXP 5 Flt Eng 1: Peggy A. Whitson (STS-111 Up) P689/R281/F35 Continued | MECO CMD: | ROLLOUT: 10574 FT 75 SEC WINDS: H3 R7 KTS OFFICIAL: 0308P13 H4 R7 DENS ALT: 580 FT FLT DURATION: 13:18:47:26 | ISS005-E-2154 approaches the cargo bay. | 46 (25 Nover e ISS with th | nber 2002) e Port One (F | - Endeavou 21) truss in t | the | 5 CRYO TK SETS 6 GN2 TANKS RMS 70 RMS USED TO UNBERTH P1 ITS AND HAND-OFF TO SSRMS FOR MATE TO SO TRUSS. | get access to PCS 2 O ₂ line under PLB liner, an Access Platform came in contact with the RMS damaging the TPS, Kevlar honeycomb with minor delamination to composite boom. Tests and analyses proved it is OK to fly-as-is. On November 20, set launch date to 11/22/02. Technical Scrub. -Scrubbed 11/22/02 launch planned for 8:15:30 PM EST at L-8 minutes due to unstable weather at ZZA and MRN. Early forecasts were showers within 20nm at Zaragoza and occasional overcast 1500 feet and showers at MRN. At L-1 hour, Moron weather had improved and FD updated TAL to Moron. However, both TAL sites were forecast and observed NO GO at the L-8 minute scrub time and at TAL landing times. TAL weather Scrub. Ben Gurefir was not available as a TAL site; however, Ben Guerir was observed NO GO for ceiling and showers. Continued |

| | | | SP | ACE SHU | JIILE | MI | 551 | ONS | S | UMMA | RY Page 2-155 - \$15-113/11A |
|-----------|---------|--|---|---|----------------------------------|-------------|-----|-------|-----|---------------------|--|
| FLT | ORBITER | CREW 7 UP/7 DOWN | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | 0 | RBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXP | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-113/ | | Continued | Continued | Continued | | | | | | | Continued |
| ISS 11A | | SS EVA 86 | OMS-2: | <u>S/T</u> : 1015:13:34:10 | | | | | | | LAUNCH WINDOW: |
| Continued | | DOCKED QUEST EVA 12 EMU/TETHERED EVA 79 SCHEDULED EVA 80 | 38.12 37:49.2 250 FPS 256 FPS 2:42 5:31 | OV-105: 206:14:12:06 | | | | | | | ISS first Planar window opened at 328:00:44:48Z and closed at 328:0054:46Z with PLT at 328:00:49:47Z (7:49:47 PM EST) for a 7M08S launch window. Second Planar window opened at 328:00:47:56Z and closed at 328:00:57:55Z. |
| | | DURATION 6:45 SS EVA 87 DOCKED QUEST EVA 13 | | DISTANCE: 5,735,600 sm | | | | | | | LAUNCH DELAYS: NONE - Launch occurred on time at 328:00:49:47Z, 7:49:47 PM EST Sat. 11/ 23/ 2002. |
| | | EMU/TETHERED EVA 80 | | | | | | | | | TAL WX: |



MCC WHITE FCR (42)

DOCKED QUEST EVA 14 EMU/TETHERED EVA 81 SCHEDULED EVA 82 **DURATION 7:00**

SCHEDULED EVA 81 **DURATION 6:10** SS EVA 88

FLIGHT DIRECTORS: ISS LD/O1 - A. F. Algate ISS O 2 - M. A. Kirasich ISS PLNG - A. P. Hasbrook STS LD/O 1 - P. L. Engelauf STS O 2 - C. A. Koerner STS O 3/PLNG - J. M. Curry A/E - J. P. Shannon MOD - R. E. Castle



--- THREE UP (EXP 6) THREE DOWN (EXP 5) ---

STS113-E-05230 (29 November 2002) --- The STS-113 (red shirts). Expedition Five (right) and Expedition Six crewmembers (left) gathered for a group photo in the Destiny laboratory on the ISS. The STS-113 crew, front to back, are astronauts James D. Wetherbee, Mission Commander; John B. Herrington (left), Michael E. Lopez-Alegria, Mission Specialists; and Paul S. Lockhart, Pilot. The Expedition Six crew, front to back, are astronauts Kenneth D. Bowersox, Commander: Donald R. Pettit, NASA ISS Science Officer; and cosmonaut Nikolai M. Budarin, Flight Engineer. The Expedition Five crew, front to back, are cosmonaut Valery G. Korzun, Commander; astronaut Peggy A. Whitson, NASA ISS Science Officer; and cosmonaut Sergei Y. Treschev, Flight Engineer. Korzun, Treschev, and Budarin represent Rosaviakosmos.

-Zaragoza (prime and selected) was forecast and observed GO. Moron was forecast NO GO for ceiling (BKN 2500 ft and showers within 20 nm) but verified GO at landing time. 2-Eng TAL call ZZA. Ben Guerir was N/A, but was NO GO.

PERFORMANCE ENHANCEMENTS:
- Standard Set plus: (1) PE Operational High Q (WIN/DEC), (2) OMS Assist, (3) 52 NM MECO, (4) Del Psi

First flight with 3 Days Extension due to weather wave-offs.

- Record Minimum Crossrange of 2.1 nautical miles.
- John Herrington/MS2 is the first & as of 2010 the only Native American to fly in space. He is an enrolled member of the Chickasaw Nation.

6th & 7th SHUTTLE CREWMEMBER REPLACEMENTS
- Gus Loria was replaced by Lockhart in Aug. 2002 and Don Thomas (to join EXP 6) by Pettit in Jul. 2002 - both due to medical issues. (Fifth Shuttle crewmember réplacement occurred on STS-98.)

FLIGHT DURATION CHANGES: Extended flight 3 days total.

- EOM - Planned landing at KSC on orbit 170 (Tig orbit 169) at 338:20:49Z, 3:49
PM EST on Wednesday, December 4, 2002. Waved-off landing on orbit 170 (Tig orbit 169) at Tig-21 minutes due to NO GO forecast for ceiling (broken 6000 feet). Weather reported that at landing time ceiling was 8000 feet and showers at 30 nm

Weather reported that at landing time ceiling was 8000 feet and showers at 30 nm (GO Observation).

Waved-off landing on orbit 171 (Tig orbit 170) at Tig –24 minutes due to NO GO Forecast of ceiling 6500 feet. (One day extension) waveoff 1 day. Landing observations verified NO GO (BKN 6500 feet).

EOM-1 - Waved-off landing at KSC on orbit 185 (Tig orbit 184) at 339:19:54Z, 2:54 PM EST on Thursday, December 5, 2002 at approximately Tig-3H15M due to observed 18 knot crosswinds, moisture within 30 nm and broken 7000 feet.

Waved-off landing at KSC on orbit 186 (Tig orbit 185) a few minutes later for crosswind moisture and ceiling violations.

- Waved-off landing at KSC on orbit 186 (Lig orbit 185) a few minutes later for crosswind, moisture, and ceiling violations.

(Second day Extension) waveoff 2 days.

- EOM+2 - Waved-off landing at KSC on orbit 200 at 340:18:57Z, 1:57 PM EST on Friday, December 6, 2002 at Tig-3H03M due to NO GO forecast and observed drizzle at SLF and overcast 900 ft.

- Decided to proceed with Deorbit Prep for orbit 201 landing but not fluid load.

Closed the PLBD's and gave GO for OPS 3 transition. Weather violations continued. Waved-off landing at Tig-1H12M due to continued NO GO observed and forecast drizzle/fog, visibility 3 miles and overcast 600 feet. (Third Day Extension) waveoff 3 days.

Extension) waveoff 3 days.

- EOM+3 - Landed at KSC Runway 33 on orbit 216 at 341:19:37:13Z, 2:37:13 PM
EST, Saturday, December 7, 2002 (MET 13:18:47:26). Total extensions 3 Days
(Record for three days extension due to weather, landed on EOM+4). STS-57 was dextended 3 days; however, the first day extension was for science and the last 2 days were weather extensions. Record minimum crossrange of 2.1 miles

Continued...

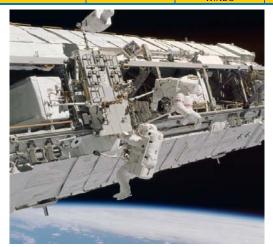
| ELT | ORBITER | CREW 7 UP/7 DOWN | LAUNCH SITE, LIFTOFF TIME. | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB | ORBIT | ESIM | PAYLOAD WEIGHTS. | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS. |
|-------|---------|---------------------|-------------------------------|--|-------------------------------|-----|----------|---------|---------------------|--|
| 1 L I | UNDITER | | LII TOTT TIIVIL, | CRUSSKANGL | | | | 1 3 1 1 | | (LAUNCH SCRUDS/DELATS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC HA/H | Р | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | · | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | EXP | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | & EVA'S | | WINDS | ENG. S.N. | | | | | |

STS-113/ ISS 11A

039 --- John B. Herrington Continued. (left) and Michael E. Lopez-Alegria s, work on the newly

STS113-714-

installed Port One (P1) truss.



OMS Assist Burn and continued to indicate 96

family conferences

nozzle fuel leak, no performance impact.

SIGNIFICANT ANOMALIES:

O₂ concentration in Mid Body above expected baseline. Replaced secondary O2 line and secondary GN₂ flex hoses (IFA STS-113-V-01).
Right OMS Engine Bi-Propellant Valve 2 position indicator indicated 96 percent Open at start of

percent Open after burn (IFA STS-113-V-02). S-Band Power Amplifier 2 power output low (IFA STS-113-V-04).

S1S-113-V-04).

- Hardware C&W pushbutton failures

- APU 2 GG Bed Heater Cycles Abnormal

- Wireless Video System video problems

- FES Primary B Shutdown - Ice in Topping

Core (IFA STS-113-V-03)

- RMS Wrist Roll Sluggish Joint Response

- OCA failure during private medical and private

- PGSC for RPOP RS 422 cable bad

- Film review indicates very small engine 1 coldwall

Continued...

RENDEZVOUS #61:
- Rendezvous and Dock with ISS (PMA2 Lab Fwd Port).

SHUTTLE NIGHT LAUNCH #28:

EVENTS: - NC1_ma_neuver at 328:03:42:05Z (02:52:28 MET) resultant altitude of 170.2 by 186.7 nm.

MC4 maneuver at 329:20:27Z (01:19:37 MET) resultant altitude 203.3 by 215.5 nm.

ISS Capture (PMA 2 Lab Fwd Port) at 329:21:20:27Z (01:21:08:53 MET)
- ISS Capture (PMA 2 Lab Fwd Port) at 329:21:20:27Z (01:21:08:53 MET)
- ISS Hard dock at 329:22:10:49Z (01:21:21:02 MET).
- ODS Upper Hatch Open (all hatches open) at 329:23:29:47Z (01:22:40 MET)
- IELK S/L Transfer (Official transfer of ISS from Expedition 5 Crew to Expedition 6 Crew) at 330:02:28Z (02:01:39:13 MET)
- SRMS unberth of P1 ITS at 330:15:19:51Z (02:14:30 MET) and positioned P1 over orbiter Port Wing for handoff to SSRMS. (Thereafter SRMS camera was used only for video support of EVM activities)

used only for video support of EVA activities.)
SSRMS used to mate P1 ITS to S0 truss at 330:18:50:14Z (02:18:00:27

EVA 1 Start at 330:19:48Z (02:18:57 MET), EVA 1 End at 331:02:33Z (03:01:43 MET) on November 26, 2002, duration 6H45M. All three EVA's used Pre-Breathe Protocol while exercising on Shuttle Ergometer located in

used Pre-Breathe Protocol while exercising on Shuttle Ergometer located in mid-deck. Crew had to use Shuttle Ergometer as the CEVAS had a problem. Made connections between P1 and S0 Trusses. Released launch restraints on CETA Cart, DLA, and TARJ Stinger, installed Node 1 WETA.

- Reboost 1 at 331:17:10:47Z (03:16:21 MET) delta V + 2.4 fps, alltitude increase 2.4 mm, altitude 216 by 207 nm
- EVA 2 Start at 332:18:36Z (04:17:46 MET), EVA 2 End at 333:00:47Z (04:23:57 MET) on November 28, 2002, duration 6H10M. Installed fluid jumpers between P1 & S0. Removed P1 Port & Stbd keel pins. Installed WVS TX Assy on P1. Relocated CETA Cart from P1 to S1. Released P1/P3 line clamps. Pemoved & stowed Padiator heam launch locks line clamps. Removed & stowed Radiator beam launch locks. Reboost 2 at 333:16:50:59Z (05:16:01:12 MET), delta V = 2.56 fps, altitude increase 0.7 nm, altitude 216 by 209 nm.

EVA 3 Start at 334:19:24Z (06:18:34 MET) and End at 335:02:24Z (07:01:34 MET) on November 30, 2002, duration 7H00M. Installed Z1/P6/Lab, Lab HX, and P1 RBVM SPD's. Reconfigured electrical harnesses, route power

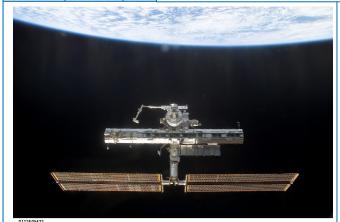
Reboost 3 at 335:16:36:47Z (07:15:49 MET), delta V = 8.6 fps, altitude increase 2.4 nm, final orbit 216.6 by 211.4 nm.

Farewell 336:17:18Z (08:16:28 MET)

ODS Upper Hatch closed at 336:17:47:47Z (08:16:58 MET), Lab Fwd Hatch (all hatches closed) closed at 326:18:15:47Z (08:17:26 MET) Undocking complete at 336:20:04:50Z (08:19:15:03 MET)

Transfers: Shuttle to ISS 2160 lbs plus P1 ITS of 27514 lbs, 690 lbs H₂O (672 lbs in 7 CWC's and 18 lbs in one PWR), 32 lbs O₂ used during prebreathe for 3 EVA's. Plus 6 LiOH cans. Transfer ISS to Shuttle 2250 lbs.

MEPSI deploy at approx. 336:22:25Z (08:21:36 MET)



STS113-E-05433 (2 December 2002) --- The ISS post undocking of Endeavour as the two spacecraft flew over northwestern Australia. The newly installed Port One (P1) truss now complements the Starboard One (S1) truss in center frame.



JSC2002-01994 --- The Ascent/Entry FCT pose for group portrait in the shuttle flight control room (WFCR) in Houston's MCC. Ascent/Entry Flight Director Wayne Hale is in center front row.

| | | | | LANDING SITE/ | SSME-TL | | | | | | |
|-----------------|-------------------------|---|-------------------------------------|------------------------------|---------------|----------|--------|----------------------------|-----|---------------------------------|---|
| | | CREW | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (7) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | a EVII 5 | | WINDS | ENG. S.N. | | | | | | |
| STS-107 | OV-102 | CDR: | KSC 39A | | 104/104/ | BI-116 | | DIRECT | | CARGO: | Brief Mission Summary: The STS-107 crew carried out a 16- |
| | (Flight 28) | Rick D. Husband (Flt 2 - STS-96) | 16:15:39:00Z 10:39:00 AM EST (P) | | 109% | RSRM | (8) | INSERTION | (5) | 35463 LBS | day mission dedicated to a mix of life and physical sciences on board the first SPACEHAB Research Double Module |
| SEQ FLT #113 | Columbia | P690/R248/V177/M216 | 10:39:00 AM EST (A) | | PREDICTED: | 88 | | POST OMS-2: | | PAYLOAD | (RDM). The crew of seven included the first Israeli astronaut. |
| LI # | | | Thursday (34) | | 100/104.5/72/ | | | 156 x 147 NM | | CHARGEABLE: | During descent for landing at KSC at an altitude of 203,000 |
| KSC-113 | OMS PODS: LPO5-17 | PLT: | 1/16/03 (10) | | 72/104.5 | ET-93 | | | | 24316 LBS | feet over north central Texas, a breach in the TPS on Columbia's left wing resulted in loss of vehicle and crew. |
| PAD 39A-40 | RPO5-16 | William C. McCool P691/R290/M254 | LAUNCH WINDOW: | DEORBIT BURN: | ACTUAL: | LWT-86 | | | | DEPLOYED: | Communications with the crew were lost at 9 AM EST, |
| PAD 39A-40 | FRC2-28 | | 2H30M CTOB | 32:13:15:18Z | 100/104.5/72/ | 2111 00 | | | | 0 LBS | Saturday, Feb. 1, 2001. Second loss of vehicle and crew in |
| MLP-1 | EDO EL T 15 | M/S 1: | EOM PLS: KSC | Sunday, February 1, 2003 | 72/104.5 | ЕТ | | | | NON DEDLOVED | Shuttle program. |
| | EDO FLT 15 S/H RDM 1 | David M. Brown P692/R291/M255 | TAL: MRN | , , | 1 = 2055 (1) | IMPACT | | | | NON-DEPLOYED: 23515 LBS | KSC W/D: OPF 79, VAB 9, PAD 35 = 123 days total. |
| | S/TT KDIVI T | | TAL WX: ZZA | PLANNED | 2 = 2053 (5) | | | | | 23313 253 | I ALINCH POSTPONEMENTS: |
| | | M/S 2: | SELECTED: | LANDING: On KSC 33 at | 3 = 2049 (7) | 1:24:35 | | | | MIDDECK: | LAUNCH POSTPONEMENTS: - Baselined launch date of 1/11/01 on 11/10/99. - Postponed launch date to 2/22/01 on 3/3/00. - Postponed launch date to 4/15/01, then 6/14/01, others(?), then to 9/2/03, moved after STS-112 and STS-113 (Priority flights to HST and ISS flights that had been ppd. due to flow-liner cracks.) - Postponed launch date to 1/16/03 |
| | | Kalpana Chawla (Flt 2 - STS-87) | RTLS: KSC 15 CI/N | 9:15:50 AM EST | | MET | | | | 801 LBS | - Postponed launch date to 2/22/01 on 3/3/00. - Postponed launch date to 4/15/01, then 6/14/01, others(2), then |
| | | P693/R230/V178/F30 | TAL: MRN 20 N/N | ODDIT DIDECTION | | LAT: | | | | <u>SHUTTLE</u> | to 9/2/03, moved after STS-112 and STS-113 (Priority flights to |
| | | MIC 2 (DA)/I OAD ODD) | AOA: EDW 04 CI/N PLS: EDW 04 N/N | ORBIT DIRECTION: DL 49 | | 2.28°N | | | | ACCUMULATED | - Postponed launch date to 1/16/03. |
| | | M/S 3 (PAYLOAD CDR): Michael P. Anderson | | 52 17 | | LONG: | | | | WEIGHTS: DEPLOYED: | ' |
| | | (Flt 2 - STS-89) | TDEL: | | | 139.42°W | | | | 1189722 LBS | LAUNCH SCRUBS: None |
| | | P694/R235/V179/M205 | 0.11 0.032/0.070 | | | | | | | NON-DEPLOYED: | <u>LAUNCH WINDOW:</u> - Launch Window was 2H30M (Crew Time On Back). |
| | | M/S 4: | MAX Q NAV: | | | | | | | 1559554 LBS CARGO TOTAL: | |
| | | Laurel Blair Salton Clark | 756 749 | | | | | | | 3547208 LBS | LAUNCH DELAYS: NONE - KSC weather was excellent, perhaps the best launch weather experienced in Shuttle Program. |
| | | P695/R292/F37 | SRB STG: | | | | | | | DEDEODMANOE | experienced in Shuttle Program. |
| | | P/S 1: | 2:05.4 2:07 | INT NAT | MODIAM | Coope | | | | PERFORMANCE MARGINS (LBS): | - Launch occurred On-Time at 16:15:39:00Z, 10:39:00 AM EST, on Thursday, January 16, 2003. |
| | | Ilan Ramon | PERF: NOMINAL | IIN IVII | EMORIAM - | - See ne | ext pa | age. | | FPR: 3047 | off Thursday, January 16, 2003. |
| | | (ISRAEL) | | | | | | | | FUEL BIAS: 1112 | TAL WX: |
| | | P696/R293/M256 | 2 ENG TAL (MRN): 2:39 2:50 | | | | | | | FINAL TDDP: 1335 RECON: 1348 | -Moron was prime and selected. Both Moron and Zaragoza were forecast and observed GO. Ben Guerir was not available. |
| | | | 2.39 2.30 | | | | | | | | PERFORMANCE ENHANCEMENTS: |
| | | | NEG RETURN: 3:50 3:52 | | EI. | | | | | PAYLOADS: | - Standard Set plus: PE Operational High Q (WIN/JAN) and OMS |
| | do | | 3:50 3:52 | | <u>El</u> : | | | | | PLB: SPACEHAB | Assist. |
| | 5 2 | | PTA (U/S 242): | ELT DUDATION. | WEIGHT: | | | | | RDM | <u>FIRSTS/LASTS</u> : |
| | CHAML | | 5:15 5:14 | FLT DURATION: 15:22:20:32 | 234495 LBS | | | DEORBIT: | | FREESTAR | - First flight of Space Shuttle in CY 2003. - First flight of Spacehah RDM (Research Double Module) with |
| | t 80 | | SE OPS 3: | Lost contact with | X CG: | | | Ha 151.6 NM Hp 135.0 NM | | OARE (MORE THAN 80 | more than 80 Experiments. Science: Biological, Physiological & |
| | | | 5:25 | Columbia at 8:59:32 | 1078.53 | | | 114 122.0 MM | | EXPERIMENTS) | Countermeasures, Physical Sciences, Earth and Space Science, Space & Technology Development |
| WH CL | CALL & | 40 | PTM (U/S 242): | AM EST | | | | VELOCITY: | | · | FIRSTS/LASTS: - First flight of Space Shuttle in CY 2003 First flight of Spacehab RDM (Research Double Module) with more than 80 Experiments. Science: Biological, Physiological & Countermeasures, Physical Sciences, Earth and Space Science, Space & Technology Development First EDO Pallet Flight since STS-90 (April 17, 1998) - First flight of Israeli Astronaut - Ilan Ramon |
| BROV | WW. | | 5:54 6:05 | <u>S/T</u> : 1031:11:54:42 | EI + 15 MIN: | | | 25762 FPS | | MIDDECK: FREESTAR - | - First flight of Israeli Astronaut - Ilan Ramon |
| HUSBANI | . 7 / | COOL | SE TAL (ZZA): | OV 102. | | | | ENTRY | | MIDDECK H/W | FLIGHT DURATION CHANGES: |
| - OSBANI | | | 5:56 6:05 | OV-102: 300:17:39:40 | WEIGHT: | | | RANGE: | | RAMBO | FLIGHT DURATION CHANGES: -Planned landing at KSC on orbit 256 (TIG orbit 255) on Saturday, February 1, 2003. Deorbit maneuver was initiated at 32:13:15:182, 8:15:18 AM EST on Saturday, February 1, 2003 (TIG orbit 255, landing orbit 256). Planned landing time was |
| | STS 107 | | | | 234167 LBS | | | 4439 NM | | S/H SUPPORT EQUIPMENT | 32:13:15:18Z, 8:15:18 AM EST on Saturday, February 1, 2003 |
| | | | SE PTM (U/S 459): 7:00 7:05 | DISTANCE: | X CG: | | | | | EZON WILIVI | (11G orbit 255, landing orbit 256). Planned landing time was 32:14:15:507. 9:15:50 AM EST. |
| | | MCC WHITE FCR (43) | | 6,649,757 sm | 1077.87 | | | | | 0.0000 TV 05T0 | - Orbiter weight and Xcg at entry interface was 234,495 lbm, Xcg |
| | | ELICUT DIDECTORS | MECO CMD: 8:20.9 8:23 | | | | | | | 9 CRYO TK SETS (EDO PALLET) | 32:14:15:502, 9:15:50 AM EST. Orbiter weight and Xcg at entry interface was 234,495 lbm, Xcg was 1078.53. Orbiter weight and Xcg at entry interface plus 15 minutes |
| | | FLIGHT DIRECTORS: LD/O 2 - K. B. Beck | | | | | | | | (LDO I NELLI) | 234,167 lbm, Xcg was 1077.87. |
| | | O 1 - J. S. Stich | <u>VI</u> : 25863 25860 | | | | | | | 5 GN2 TANKS | - riight controllers reported increased temperatures on some sensors and some failed sensors in left wing area. Off-nominal |
| | | O 3 - B. P. Austin O 4 - J. M. Hanley | | | | | | | | NO RMS | indications started at approximately 32:13:52:17Z. Columbia |
| | | A/E - L. E. Cain | OMS-2: 41.18 41:24 | | | | | | | I VI KIVIO | - Other Weight and XCg at enry interface plus 13 minutes 234,167 lbm, Xcg was 1077.87 Flight controllers reported increased temperatures on some sensors and some failed sensors in left wing area. Off-nominal indications started at approximately 32:13:52:172. Columbia contact loss (Loss-of-Signal) occurred at 32:13:59:32Z, 8:59:32 AM EST (15:22:20:32 MET), 16 minutes prior to planned landing |
| | | MOD - P. L. Engelauf | 186 FPS 186 FPS | | | | | | | | Continued |
| | | | | <u>I</u> | <u> </u> | 1 | | | | | COHUHUCU |

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE FNG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |

STS-107

Continued.

Accident Analysis indicated that the physical cause of the loss of Columbia and its crew was a breach in the Thermal Protection System on the leading edge of the left wing. The breach was initiated by a piece of insulating foam that separated from the left bipod ramp area of the External Tank and struck the wing in the vicinity of the lower half of Reinforced Carbon-Carbon panel 8 at 81.9 seconds after launch. During re-entry, this breach in the Thermal Protection System allowed superheated air to penetrate the leading-edge insulation and progressively melt the aluminum structure of the left wing, resulting in a weakening of the structure until increasing aerodynamic forces caused loss of control, failure of the left wing, and breakup of the Orbiter.

CAIB REPORT:

Shuttle Legacy Mural - Hanging in LCC Firing Room at KSC



COLUMBIA TRIBUTE

By Mike Leinbach/Launch Director & Amy Simpson/KSC PH-2, May 2010

IN MEMORIAM



The STS 107 crew is shown on-orbit in SPACEHAB research module aboard Columbia. From left (bottom row) wearing red shirts to signify their work shift color, are Kalpana Chawla/MS2, CDR Rick D. Husband, Laurel B. Clark/MS4, and Ilan Ramon/PS1(Israel). From left (top row), wearing blue shirts. are David C. Brown/MS1, PLT William C. McCool, and Michael P. Anderson/PL-CDR.

KSC-2010-4452 (http://mediaarchive.ksc.nasa.gov/index.cfm). This Tribute Display features Columbia, the "first of the fleet", rising above earth at the dawn of the Space Shuttle Program, Crew-designed patches for each of Columbia's missions lead from earth toward our remembrance of the STS-107 crew. In the background are images from the Chandra X-Ray Observatory (launched aboard STS-93) representing Columbia's contributions toward scientific discovery. Other significant accomplishments include the first space shuttle landing at White Sands with STS-3, first deployment of commercial satellites during STS-5, first four-member crew on STS-5, first Spacelab mission and first six-member crew on STS-9, first female mission commander (Eileen Collins) on STS-93, as well as multiple laboratory missions—many with international partnership. (May 2010)

Continued...

FLIGHT DURATION CHANGES: (continued)
time. Communications and tracking were lost at an altitude of
approximately 203,000 feet while Columbia was traveling at approximately 12,500 miles per hour at Mach 18. Columbia and 7 astronauts were lost over Texas.

RED SHIFT: Rick Husband, Kalpana Chawla, Laurel Clark, Ilan

BLUE SHIFT: William McCool, David Brown, Michael Anderson (PL CDR)

STS-107 EVENTS:

Orbital Altitude was 150 nm.

TS-107 FLIGHT OBJECTIVES/EXPERIMENTS

STS-107 FLIGHT OBJECTIVES/EXPERIMENTS:

- Flight was a dedicated and successful science/research mission.
- Primary payload is SPACEHAB Research Double Module
(SHRDM) with International, NASA and SPACEHAB commercial
payloads including Life Sciences, Materials, and Microgravity
Science Research Experiments.
- Fast Reacting Experiments Enabling Science, Technology,
Applications and Research (FREESTAR) is a complex
Secondary Payload which is a cross bay carrier with following
payloads: MEIDEX (Mediternaean Israeli Dust Experiment),
Solar Constant-3 (SOLCON-3), Shuttle Ozone Limb Sounding
Experiment-2 (SOLSE-2), Critical Viscosity of Xenon-2 (CVX-2),
Low Power Transceiver (LPT), and Space Experiment Module-14
(SEM-14)

Ram Burn Observation (RAMBO)

SIGNIFICANT ANOMALIES:
-ET Foam loss during ascent at approximately 81 seconds (likely from Bi-pod area) (IFA). Re-design constraint to flight.
-RSRM Nozzle Flex Boot Separation (IFA). Constraint to flight.
-O₂ Tank 7 Heater failed off in Manual Mode (IFA STS-107-V-02)
-Suspected Fuel Cell Monitoring System Data Cable problem.
-FCMS is suspect after same problem with backup cable.
-SM I/O Errors Moserate 23 (I ago of the a recording and plantack)

DSR 20 Error Message 32 (Loss of tape recording and playback) 70 mm Hasselblad Intermittent Motor Drive (Binds or jams) 2nd 70 mm Hasselblad Motor Jam

- STGT sile outage - Payload No I-COM B Transmission in Spacehab (Not being heard in Spacehab)

Payload Ku Channel 2 Data Dropouts (Ku-Band and S-Band)
- Payload Ku Channel 2 Data Dropouts (Ku-Band and S-Band)
- AC2 Phase B "Sluggish" Current Signature on Orbiter (IFA

STS-107-V-01)
Forward DAP Auto A Contact Deselected by RM

Spacehab Rotary Separator flooding short Loss of Columbia and crew during Entry - IFA STS-107-V-03

| FLT | ODDITED | CREW (7) | LAUNCH SITE, | LANDING SITE/ RUNWAY, | SSME-TL NOM-ABORT | SRB | (| ORBIT | FCW | PAYLOAD | MISSION HIGHLIGHTS |
|-------------------------------------|---|---|---|--|---|---------------------------------|----------------------|---|--------------|---|--|
| FLT NO. | ORBITER | TITLE, NAMES & EVA'S | LIFTOFF TIME, LANDING SITES, ABORT TIMES | CROSSRANGE LANDING TIMES FLT DURATION, WINDS | EMERG THROTTLE PROFILE ENG. S.N. | RSRM AND ET | INC | HA/HP | FSW | WEIGHTS, PAYLOADS/ EXPERIMENTS | (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-114/ LF-1 SEQ FLT #114 | OV-103 (Flight 31) Discovery OMS PODS: | 1 07//100/ 1 1 3 /// 2 4 | KSC 39B 207:14:39:00Z 10:14:39 AM EDT (P) 10:39:00 AM EDT (A) Tuesday 14 7/26/05 (8) | EDW 22, CONC EDW 50, CONC 31 221:12:11:23Z 5:11:23 AM PDT Tuesday 21 8/9/05 (7) | 104/104/109% PREDICTED: 100/104.5/104.5/ 72/104.5 | RSRM-92 ET-121 SLWT-22 | <u>P(</u> | | OI-30 (1) | CARGO: 38652 LBS PAYLOAD CHARGEABLE: 29807 LBS | Brief Mission Summary: With STS-114/LF-1 (17th ISS mission), NASA initiated Return to Flight 2 years after the Columbia accident. The crew was charged with a busy to-do list that included testing new safety techniques and delivering much-needed supplies to ISS. KSC/ND: OPF 994, VAB 25, PAD 85 = 1104 days total |
| KSC-114 PAD 39B-50 MLP-3 | LPO1-34 RPO3-32 FRC3-31 | PLT: James M. Kelly (Flt 2 - STS-102) P698/R263/V180/M229 | LAUNCH WINDOW: 4M52S (In-Plane Time) with ISS | DEORBIT BURN: 221:11:06:18Z XRANGE: 46 NM | ACTUAL: 100/104.5/104.5/ 72/104.5 1 = 2057 (1) | ET IMPACT: 1:14:10 MET | | | | DEPLOYED: 26413 LBS NON-DEPLOYED: | LAUNCH POSTPONEMENTS: - Baselined OV-104 Atlantis as ULF-1 Crew Rotation flight with launch date of 1/16/03 on 12/6/01 - Postponed launch date to NET 3/1/03 on 9/16/02. Postponemen |
| 17TH SHUTTLE FLIGHT TO ISS | | <u>M/S 1/EV-1</u> : Soichi Noguchi (Japan JAXA) P699/R294/M257 | EOM/PLS: KSC TAL: ZZA TAL WX: MRN, FMI SELECTED: | ORBIT DIR: AL 33 AIM PT: NOM | 1 = 2057 (1) 2 = 2054 (5) 3 = 2056 (3) ALL BLOCK II ENGINES | <u>LAT</u> : 36.56°S | | | | NON-DEPLOYED: 3231 LBS MIDDECK: 163 LBS | caused by Engine Flowliner cracks. - Subsequent postponements after STS-107 Accident to NET 7/21/03, NET 10/1/03, NET 12/18/03, NET 3/11/04, NET 9/12/04. - Postponed launch date to NET 3/6/05 on 3/22/04. Changed flight to ISS Logistics Flight LF-1, canceled crew rotation, and changed |
| ISS LOGISTICS FLIGHT 1 | | | RTLS: KSC 33/N/N TAL: ZZA 30/N/SFD AOA: KSC 33/N/N PLS: EDW 22/N/SFD | MLGTD: 1311 FT 221:12:11:23Z VEL: 226 KGS 222 KEAS HDOT: -5.5 FPS | | LONG: 158.7°E | | | 7 | SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 1216135 LBS | orbiters to Discovery OV-103. - Tanking Test 1 on 4/24/05 experienced two intermittent LH2 ECC anomalies. (ECO sensors #3 & #4 failed WET). Replaced MPS Point Sensor Box (PSB) and all Sensor #3 & #4 wiring to LH2 monoball. Subsequent to completion of this work the Tanking |
| | | M/S 3: Andrew S.W. Thomas (Flt 4 - STS-77, Up to Mir on STS-89, Down on STS-91, STS-102) P701/R213/V149/M186 M/S 4: | MAX Q NAV: 775 709 SRB STG: | TD NORM 205: 2761 FT DEPLOY: 192 KEAS 221:12:11:31.9Z | | | | | | NON-DEPLOYED: 1562948 LBS CARGO TOTAL: 3585860 LBS PERFORMANCE | Test #2 LH ₂ Sensor performance was nominal. - Postponed launch date to NET 5/12/05, 5/15/05, 5/22/05, 7/13/05 - Rolled back from pad 39B to VAB on 5/26/05 to swap stacks with STS-121, due to a late all-flights requirement for a heater on the ET LO ₂ Feedline upper bellows, to prevent formation of critical ascent ice debris in that area. Installation of the bellows heater was started on ET-121 (STS-114 was ET-120) in the VAB before the STS-114 stack was rolled-back. Removed and replaced an |
| | Dente Jacobs | Wendy B. Lawrence (Fit 4 - STS-67, STS-86, STS-91) P702/R192/V146/F25 | PERF: NOMINAL: 2 ENG TAL (ZZA): 2:43 2:44 | NLGTD: 6573 FT 221:12:11:38Z VEL: 163 KGS 156 KEAS | | | | | | MARGINS (LBS): FPR: 3098 FUEL BIAS: 1269 FINAL TDDP: 2111 RECON: 3792 | out-of-spec H₂ diffuser Replaced MPS PSB after a power card failure Rolled out to Pad 39B on 06/15/05 and set launch date of 07/13/05 on 05/22/05. |
| LF | | <u>M/S 5:</u> Charles Camarda P703/R295/M258 | NEG RETURN: 3:52 3:57 PTA (U/S 182): | HDOT: -6.4 FPS BRK INIT: 90 KGS DRAG CHUTE | 72 | | | J | | PAYLOADS: PLB: ISS LF-1 MPLM | Scrubbed 07/13/05 launch attempt at 194:17:30Z (L-2:14:51 to Window Opening) when LH₂ ECO Sensor #2 failed WET (failed to transition to DRY with Sim Commands). This violated OMRSD and LCC MPS-22 requirements for four functional LH₂ sensors. |
| | | SS EVA 89 EMU/TETHERED EVA 82 SCHEDULED EVA 83 DURATION 6:50 | 5:10 5:14 <u>SE TAL (ZZA 104)</u> : 6:09 6:14 | <u>JETTISON</u> : 53 KGS 221:12:12:08Z | JSC2005-E-16 | | | | | RAFFAELLO, ESP2, LMC, RMS, ODS, OBSS MIDDECK: | Extensive tests were conducted that identified a degraded PSB ground and some evidence of EMI as potential causes of the false WET problem. At MMT on 07/20/05, decided to set launch for 07/26/05 (without a special tanking test), allowing sufficient time to clean up the ground and EMI. Decision was made to |
| W. K. | 11 g | SS EVA 90 EMU/TETHERED EVA 83 SCHEDULED EVA 84 DURATION 7:14 | PTM (U/S 614): 6:10 6:14 SE PRESS 104: 6:57 7:02 | BRK_DECEL FPS ² : AVE 5.1 PK 6.6 WHEELS STOP: 221:12:12:31Z | STS-114 Retu Assembly, cre return to the M beyond. | w patch, fir | st step f | or humans | | ISS LF-1 RAMBO 5 CRYO TK SETS 6 GN2 TANKS | LAUNCH SCRUBS: - Scrubbed 07/13/05 launch attempt at 194:17:30Z (L-2:14:51 to Window Opening) when LH ₂ ECO Sensor #2 failed WET (failed to transition to DRY with Sim Commands). This violated OMRSD and LCC MPS-22 requirements for four functional LH ₂ sensors. Extensive tests were conducted that identified a degraded PSB ground and some evidence of EMI as potential causes of the false WET problem. At MMT on 07/20/05, decided to set launch for 07/26/05 (without a special tanking test), allowing sufficient time to clean up the ground and EMI. Decision was made to perform ECO Sensor #2 and #4 pin swap that provides additional troubleshoot results. (Note: ECO sensors operated normally on 7/26/05; further analyses and tests have significantly reduced the concerns about PSB grounding and EMI as causes of the STS-114 anomalies, but this remains a UA as of February 2006) Weather: All three TAL sites were forecast and observed GO. RTLS and AOA1 landing site KSC was forecast NO GO for |
| | | SCHEDULED EVA 85 DURATION 6:01 | | 12657 FT ROLLOUT: 11346 FT 68 SEC | M 3 EOM: WEIGHT: 225792 LBS X CG: 1086.58 | | H _i | <u>EORBIT</u> : a 191.0 NM p 168.0 NM NTRY | | RMS 71 RMS USED FOR TPS SURVEYS | precipitation and thunderstorms within 20 NM and observed NO GO for thunderstorms within 20 NM (Anvil). 07/13/05 Launch Attempt was a combined Technical/Weather Scrub. |
| | | Continued | OMS-2: 37:40 38:00 100.7 FPS 99 FPS | NO BLACKOUT DURING ENTRY | LANDING: WEIGHT: 225727 LBS X CG: 1088.21 | | VI 25 EI R. | ELOCITY: 5858 FPS NTRY: ANGE: 416 NM | | AND TWO GAP FILLER REMOVALS | LAUNCH WINDOW: Window opened at 207:14:34:33Z and closed at 207:14:43:52Z for a total window of 9M19S. The Preferred Launch Time (In-Plane Time) was 207:14:39:00Z resulting in a Launch Window of 4M52S. Continued |

SRB

RSRM

AND

ET

INC

SSME-TL

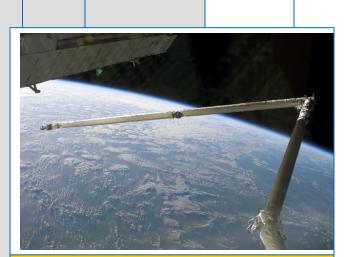
NOM-ABORT

EMERG

THROTTLE

PROFILE

| FLT NO. | ORBITER | CREW (7) TITLE, NAMES & EVA'S | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS |
|-------------------------------|---------|--|--|---|
| STS-114/ LF-1 Continued | | Continued MCC WHITE FCR (44) FLIGHT DIRECTORS: SHUTTLE: A/E - LeRoy Cain LD/O 1 - Paul Hill O 2 - Anthony Ceccacci O 3/Plng - Catherine Koerner Team 4 - Kelly Beck WX - Steven Stich MOD - Phil Engelauf ISS: LD/O 2 - Mark Ferring O 1 - Bryan Lunney O 3/Plng - Joel Montalbano Team 4 - Richard LaBrode | | Continued DENS ALT: 3799 FT FLT DURATION: 13:21:32:23 S/T: 1045:09:27:05 OV-103: 255:20:12:58 DISTANCE: 5,796,419 sm |



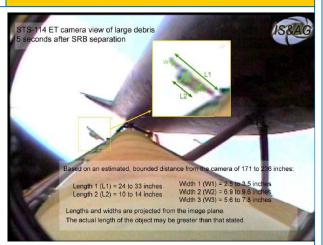
First use of the 50-foot-long robotic arm known as Orbiter Boom Sensor System (OBSS) equipped with laser imager and cameras to inspect for ascent damage of Wing Leading Edges RCC and Shuttle Bottom Tiles during approach and docking with ISS.



ORBIT

HA/HP

S114-E-5070 (26 July 2005) --- Photo shows a large piece of foam detached from ET PAL Ramp (light spot centered just below LO₂ feedline). The debris was also seen on ET live video camera, in photo below at left, and indicated no impact to Discovery.



From MMT Brief of IFA: "ET TPS Foam Loss During Ascent - Constraint to next flight"

Continued...

PAYLOAD

WEIGHTS

PAYLOADS/

EXPERIMENTS

FSW

None. Launch occurred at 207:14:39:00Z, 10:39:00 AM EDT on Tuesday, 07/26/05.

MISSION HIGHLIGHTS

(LAUNCH SCRUBS/DELAYS

TAL WEATHER, ASCENT I-LOADS.

FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

Zaragoza (Primary and Selected) was forecast and observed GO. Moron was forecast and observed NO GO for Crosswind. FMI (Istres) was forecast GO but observed NO GO for Tailwind

PERFORMANCE ENHANCEMENTS:

Standard Set plus: (1) PE Operational High Q SUM/JUL, (2) OMS Assist, (3) 52 NM MECO, (4) Del Psi

- FLIGHT DURATION CHANGES:
 On Flight Day 4, decision made to extend flight 1 day to give more time to transfer activities to and from ISS. EOM Day: Deorbit Tig on Orbit 201 was at 220:07:43Z and landing time at KSC on Orbit 202 at 12/18:07 MET 220:08:46Z (4:46 AM EDT). EDW was not called up for support on EOM day.
- Early weather forecast was GO except for a chance of showers. Gave crew a GO for PLBD closure at 220:05:15Z. Light rain was observed at SLF for a few minutes. At 220:06:15Z gave crew a observed at SLF for a few minutes. At 220:06:15Z gave crew a GO for fluid loading. Last forecast changed to NO GO at 220:0643Z with observed broken low clouds at 1000 feet in SLF area. At 220:07:16Z, due to low clouds, decision was made to wave off first opportunity at KSC. KSC was observed GO at landing time. Flight extension 1 day plus one orbit. KSC opportunity 2 Deorbit Tig on Orbit 202 was at 220:09:19Z and landing time at KSC was 220:10:22Z (5:42 AM CDT). Last forecast at 220:08:46Z was GO. However, due to unstable conditions in low clouds. ED made decision to wave off landing at conditions in low clouds. FD made decision to wave off landing at KSC on second opportunity. KSC was observed NO GO due to precipitation in SLF area. Flight extension now 2 days.
- EOM + 1 Day: All three EOM landing sites KSC, EDW, and NOR were called up on pick-em day with Discovery landing at one of the three sites. First opportunity for a KSC landing was on Orbit 218 at 221:09:08Z with Tig at 220:08:05Z on Orbit 217. Gave a GO for PLBD closing at 221:05:05Z but did not give a GO for crew fluid loading. Weather was NO GO with showers, thunderstorms, and confirmed electrified cloud within 30 NM. Showers and thunderstorms were forecast within 30 NM at landing time. At 221:06:55Z, waved off landing at KSC on Orbit 218. Flight extensions 2 days + one orbit.
- Changed Landing site to EDW. Targeted landing at KSC on Orbit 219 at 221:10:43Z. Gave crew a GO to fluid load at 221:08:40Z. At 221:08:43Z, weather forecaster reported two cells developing rapidly northeast of field moving NE with lightning in a northeast cell. At 221:08:57Z, Crew reported APU prestart complete. Current observations at SLF had showers within 30 NM with electrified cirrus (anvil) within 30 NM with forecast of thunderstorms within 30 NM moving NE. At 221:09:00, Flight Director advised crew to stop fluid loading. Waved off landing at KSC on Orbit 219, the last opportunity on FD 13. Decision made to change landing sites to EDW concrete runway 22 on Orbit 220. Flight extensions 2 days + two orbits. Flight extensions 2 days + two orbits.

Continued.

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|-------------------------|-------------------------------|--|--------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, | THROTTLE PROFILE FNG S N | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |

Continued.







CDR Collins



Discovery was about 600 ft from ISS when CDR Collins performed the first R-Bar (backflip) maneuver to allow inspection of the vehicle heat shield. Photos were analyzed on the ground to assess any damage during ascent. (Photos shown top to bottom are: iss011e11255. iss011e11257, Iss011e11260. iss011e11263.

Iss011e11270)



S114-E-6751 (2 August 2005) --- Crew portrait in Destiny Lab. From left (front row) are Thomas/MS, CDR Collins, & Noguchi/MS (JAXA). From left (back row) are PLT Kelly, Camarda/MS, Robinson/MS, & Lawrence/MS.



S114-E-6062 --- Noguchi (JAXA) participates in Mission's first FVA demonstrating Shuttle thermal protection repair techniques.

Continued..

Targeted landing at EDW on orbit 220. Discovery landed with MLGTD at EDW 22 at 221:12:11:23Z, 13:22:32:23 MET, 5:11:23 AM PDT on August 9, 2005. NLGTD was at 221:12:11:38Z.

- First flight in Return-To-Flight after Columbia STS-107.
 First flaunch in 922 days after STS-107 launch.
 First flight with Istres, France as a TAL site.
 First flight with ET bipod redesign to eliminate large insulating foam ramps as a debris source and replace them with electric
- readers.

 First use of the 50-foot-long robotic arm extension known as Orbiter Boom Sensor System (OBSS) equipped with Laser Imager and cameras to inspect Wing Leading Edges RCC and the Shuttle Bottom tiles for damage.

 First use of upgraded Ground Camera Ascent Imagery System, two WB-57 aircraft based video, and ship and ground based
- First use of WLE instrumentation behind RCC panels to gather and downlink acceleration and temperature data during ascent
- First use of orbiter back-flip pirouette (R-bar pitch maneuver) to allow ISS based photography of orbiter bottom TPS.

 First EVA crew to make repairs on shuttle bottom. Removed gap fillers protruding approximately 1 inch from black tiles in two areas of orbiter bottom black tiles, each extended approximately 1 inch.
- Gap fillers were removed during EVA 3.
 First flight with ET design change to use heater in bipod ramp area to prevent ice/frost buildup (in lieu of insulating foam in that
- Mandated day-time launch for STS-114 and STS-121 to provide proper lighting for video and film cameras observation of ET
- debris shedding during ascent.
 First flight with ET LOX Feedline upper bellows heater to prevent formation of critical ascent ice debris in that area.

- ET Separation at 207:14:47:00Z, 8:46 GET MC-1 maneuver at 01:17:37:53, delta V 0.44 ft/sec Orbit 199.7 by

- 213.1 NM
 FD2 SRMS/OBSS survey of Wing Leading Edges and nose cap
 FD2 SRMS survey of orbiter upper surfaces
 ISS capture at 209:11:17:20Z (01:20:38:20 MET)
 Hard Dock: 209:11:31:53Z (01:20:52:53 MET)
 Open Lab Fwd Hatch at 209:11:51:00Z (01:21:12 MET)
 Open APAS Hatch at 209:12:35:00Z (01:21:56:00 MET)
 Open ODS Hatch at 209:12:14:00Z (01:22:14 MET) ISS ingress
 FD4 OBSS survey of heat-protection tiles. MPLM docked to Node 1. MPLM and Middeck transfers begin.
 EVA 1 start at 211:09:45:50Z, 3:19:06:50 MET, duration 6H50M, pp. 07/30/05. Crew members performed FWA & NOAX TPS
- on 07/30/05. Crew members performed EWA & NOAX TPS sample repair DTO 848 in PLB. Crew used OBSS to scan predamaged RCC samples on DTO pallet.

Continued.

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|------|---------|---------|--------------------------|--|
| | ORDITER | | | | | | INIC | LIA/LID | 1 3 4 4 | | |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE FNG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |

STS-114/ LF-1

Continued.



ISS011-E-11517 (5 August 2005) --- ISS Canadarm2 grasps the MPLM for transfer from ISS Unity Node back to Discovery's cargo bay for return to Earth. James Kelly/Pilot, and Wendy Lawrence/MS controlled the transfer.



S114-E-6642 --- Robinson anchored to a foot restraint on ISS Canadarm2, participates in the mission's third EVA which included removal of two gap fillers protruding from orbiter bottom tiles.



JSC2004-E-45140 ---Lead Flight Director Paul Hill (foreground) and CAPCOM Stephen N. Frick monitor communications in the Shuttle Flight Control Room (WFCR) in JSC MCC with the STS-114 crewmembers during a fully-integrated simulation - one of many to establish readiness for Return to Flight.



JSC2005-E-32538 (5 August 2005) --- U.S. Senator Kay Bailey Hutchison (R.-Texas) and U.S. Representative Tom DeLay (R.-Texas) talk to CDR Eileen M. Collins aboard Discovery. Looking on are NASA Administrator Mike Griffin (left) and Flight Director Jeff Hanley.

Continued...

EVENTS (Continued):

- EVA 2 start at 213:08:43:00, 5:18:04:00 MET, duration 7H14M, on 08/01/05. EVA crew removed, replaced, and performed checkout of ISS CMG 1. Crew started CMG 1.
- EVA 3 start at 215:08:48:00Z, 7:18:09:00 MET, duration 6H01M, on 08/03/05. Installed External Stowage Platform (ESP-2) on ISS airlock. Removed gap filler material (two) protruding from orbiter bottom tiles.
- Orbiter undocked from ISS at 218:07:23:45Z (10:16:44:45 MET)
 Total Consumables transferred to ISS 1855.2 lbm (18 CWC's & 5 PWR's), $N_2=29$ lbm tank-to-tank; Stack-to-slack $O_2=60.85$ lbm (27.6 lbm atmo & 33.3 metabolic), N_2 to ISS cabin transfer =
- Total MPLM transfers to ISS 3695 lbs (2095 Cargo and 1600 HRF). 6600 lbs transferred to MPLM/Discovery for return to
- ISS Visitor Time was 8D19H51M52S (Hard dock to Undock) Sep 1 Burn at 218:08:36:26Z Ha 193.5 Hp 189.3, Sep Burn 2 at 218:09:04:26Z Ha 194.1 Hp 168.1 NM
- Orbit Adjust Burn at 221:11:06:18Z H

RENDEZVOUS # 62: Rendezvous and dock with ISS.

SPACE SHUTTLE NIGHT LANDING: # 20 total and sixth night landing at EDW.

- SIGNIFICANT ANOMALIES: LH₂ ECO sensor #2 stayed wet when commanded dry caused launch scrub.
- ET TPS damages and TPS foam losses during ascent constraint to next flight:
- LH₂ PAL ramp, Ice/Frost ramp, Acreage, Intertank flange foam

- IOSSES.

 +Y thrust strut flange and -Y Bipod spindle closeout foam losses.

 TPS Blanket damage near window 1

 TPS Gap Filler Protuberances (removed during EVA 3)

 Nose Landing Gear TPS tile damage

 APU 2 momentary loss of Press & Temp Indications

 ODS Capture Latch manual release talkback showed "Open" prior to hooks drive
- Airlock Aft "B" Hatch Closure difficulties
- Airlock Depress Off-Nominal
- TCS repeated loss of Track
- VRCS thruster R5R Low Pc. Heater may have failed on. MPS/SSME low pressure helium decay rate exceeded WSB GN₂ Regulator outlet pressure low High O₂ concentration in aft compartment during ascent

- Loss of several Orbiter tile putty repairs during ascent
- Late release of two FRCS Thruster TYVEK rain covers during
- Orbiter forward ET attach point NSI pyro bolt ejection after nominal NSI firing

| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
|---------------|-----------------------|---|--|---------------------------------------|------------------------|----------------------------|--------|-------------------------|----------|-------------------------------|--|
| | | | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (7 up, 6 down) | LIFTOFF TIME. | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | O REF. ER | | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| IVO. | | TITLE, NAMES | ABORT TIMES | FLT DURATION, | PROFILE | ET | IIVC | HIZVIII | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | & EVA'S | ADOINT TIMES | WINDS | ENG. S.N. | Li | | | | LAI LINIVILIVIO | TIKSTS, SIGNII ICANT ANOMALIES, ETC.) |
| STS-121/ | 01/ 102 | CDD. | VCC 20D | | | DI 12/ | F1 /0 | DIDECT | 01.20 | 04000 | Dula S.M. and an Community CTC 404 (U.S. 4.440) (CC malantam) |
| 313-121/ (| OV-103 (Flight 32) | CDR: | KSC 39B 185:18:37:55 Z | KSC 15 (KSC 62) 198:13:14:42 Z | 104/104/109% | BI-126 | | DIRECT INSERTION | (2) | CARGO: | Brief Mission Summary: STS-121/ULF1.1 (18th ISS mission) |
| | Discovery | Steven W. Lindsey (Flt 4 - STS-87, STS-95, | 2:37:55 PM FDT (P) | 9:14:42 AM EDT | DREDICTED: | RSRM | (10) | INSERTION | (2) | 37736 LBS | continued the testing of new equipment and procedures for increasing Space Shuttle safety of flight. Specifically, this |
| SEQ | Discovery | (Fil 4 - 515-87, 515-95, STS-104) | 2:37:55 PM EDT (P) 2:37:55 PM EDT (A) | Monday 21 | PREDICTED: 100/104.5/ | 93 | | POST OMS-2: | | PAYLOAD | mission continued the testing of ET design and process |
| FLT# 115 | OMS PODS: | P704/R229/V131/M200 | Huesday 15 | Monday 21 7/17/06 (11) | 104.5/67 | , , | | POST OMS-2: 123.6 NM | | CHARGEABLE: | changes for minimizing notentially damaging debrie during |
| | LPO1-27 | 1 704/1022/10131/10200 | 7/4/06 (9) | | 104.5 | ET-119 | | BY | | 29280 LBS | launch around and flight camera systems for vehicle |
| | RPO3-34 | PLT: | | <u>DEORBIT BURN</u> : | | 01117 | | 85.0 NM | | 27200 LDS | changes for minimizing potentially damaging debris during launch, ground and flight camera systems for vehicle observations during launch, and techniques for on-orbit inspection and repair of vehicle TPS. The flight also delivered |
| F | FRC3-32 | Mark E. Kelly (Flt 2 (STS-108)) P705/R271/V181/M237 | LAUNCH WINDOW: | 198:12:06.55 Z | ACTUAL: | SLWT | | | | DEPLOYED: | inspection and repair of vehicle TPS. The flight also delivered |
| PAD 39B-51 | | (Flt 2 (STS-108)) | 3M43S (In-plane time with ISS) | XRANGE: 258 NM | 100/104.5/ 104.5/67 | 23 | | DEORBIT: | | 23696 LBS | critical supplies and cargo for the repair and future expansion |
| | | P705/R271/V181/M237 | WILLI 133) | ARAINGE. 200 INIVI | 104.5/67 | | | HA 190.7 NM | | | of the ISS. |
| MLP-1 | | EV2/M/S 1 (PAYLOAD CDR): | FOM PLS: KSC | ORBIT DIR: AL 34 | 104.3 | | | HP 176.7 NM | | NON-DEPLOYED: | |
| 18th Shuttle | | Michael E. Fossum | EOM PLS: KSC TAL: MRN | | 1 = 2045 (8) | ET | | , ., ., ., ., | | 5426 LBS | KSC W/D: OPF 264, VAB 7, PAD 41 = 312 days total. |
| Flight to ISS | | P706/R296/M259 | TAL WX: ZZA, FMI | <u>AIM PT</u> : NOMINAL | 2 = 2051 (5) | <u>ET</u> <u>IMPACT</u> | | <u>ENTRY</u> | | | |
| 1001 - 1 " | | | 05150753 | LU OTD | 3 = 2056 (4) | | | <u>VELOCITY</u> : | | MIDDECK: | LAUNCH POSTPONEMENTS: |
| ISS Logistics | | <u>M/S 2</u> : | SELECTED: | MLGTD: 3273 FT | All Dissisti | MET | | 25862 FPS | | 158 LBS | - Baselined OV-103 launch date of 11/15/04 on 10/26/03 - Postponed launch date to NET 5/5/05 on 3/26/04. Slip due to |
| Flight 2 | | Lisa M. Nowak | RTLS: KSC 33/N/N TAL: MRN 20/CI/N | 198:13:14:42 Z VEL: 198 KGS | All Block II | 1:14:32 | | <u>ENTRY</u> | | CULITTUE | Columbia accident |
| | | P707/R297/F38 | AOA: KSC 15/N/N | 199 KEAS | Engines | LAT: | | RANGE: | | SHUTTLE ACCUMULATED | - Postponed launch date to NET //10/05 on 10/29/04. Slip due to |
| | | M/C 2. | PLS : EDW 22/N/N | HDOT: -1.8 FPS | | 35.845S | | 4494 NM | | WEIGHTS: | Columbia accident |
| 99 | | M/S 3: Stephanie D. Wilson | | | M 3 EOM: WEIGHT: | | | | | WLIGITIS. | - Postponed launch date to NET 7/12/05 on 2/17/05 to provide on |
| STS-12 | 21 - | P708/R298/F39 | <u>TDEL</u> : 0.09 .172 | TD NORM 205: | WEIGHT: | LONG: | | | | DEPLOYED: | acceptable launch lighting conditions - Postponed launch date to NET 9/9/05 on 5/23/05 to reflect latest |
| No. | · TELL | | 0.09 .172 | 2662 FT | 226063 LBS | 157.76 W | | | | 1239831 LBS | planning decisions |
| (N) //N | | EV1/M/S 4: | MAX Q NAV: | DRAG CHUTE | X CG: 1084.58 | | | | | | - Postponed launch date to TBD on 11/15/05 - Postponed launch date to 5/10/06 on 3/16/06 |
| A · T | <u>\</u> | Piers J. Sellers | 684 660 | DEPLOY: | 1004.30 | | | | | NON-DEPLOYED: 1568532 LBS | - Postponed launch date to 5/10/06 on 3/16/06 |
| § . 7 | Žo Š | (Flt 2 (STS-112)) P709/R285/V182/M249 | 000 | 189 KEAS | LANDING: | | | | | 1568532 LBS | - Postponed launch date to 7/1/06 |
| | 5 | P709/R203/V102/W249 | SRB STG: | 198:13:14:45 Z | WEIGHT: | | | | | 0.000.000.000.000.000 | LAUNCH SCRUBS: - Scrubbed Saturday 7/1/2006 launch attempt at 182:19:46Z (at L- 0h2m41s) while holding count at L-9 min. The window opened at 182:19:43:41 and closed at 19:53:41Z. The Preferred Launch Time was 183:19:26:11Z. Last forecast for KSC RTLS was forecast and observed NO-GO for thunderstorm attached anvils within 20 NM. KSC AOA1 and NOR AOA2 were forecast and observed NO-GO for thunderstorms within 20 NM. KSC PLS3 was forecast GO but observed crosswind of 19 knots. Primary TAL Moron and alternates Zaragoza and Istres (France) were forecast and observed GO. Weather scrub for KSC RTLS, AOA1 and PLS3. |
| Co. | ALERE . | M/S 5 UP, stay as ISS EXP | 2:03 2.02 | | 225972 LBS | | | | | CARGO TOTAL: | - Scrubbed Saturday 7/1/2006 launch attempt at 182:19:46Z (at |
| REITE | R SE | 13 FE: | DEDE MOMINIAL | NLGTD: 6646 FT 198:13:14:53Z | X CG: | | | | | 3623596 LBS | L- 0h2m41s) while holding count at L-9 min. The window |
| | | Thomas Reiter | <u>PERF</u> : NOMINAL | 198:13:14:53 <u>Z</u> VEL: 149 KGS | 1086.32 | | | | | PERFORMANCE | opened at 182:19:43:41 and closed at 19:53:41Z. The Preferred |
| | | P710/R299/M260 | 2 ENG TAL: | 145 KEAS | | | | | | MARGINS (LBS): | was forecast and observed NO-GO for thunderstorm attached |
| -1 | | (ESA - Germany) | 2:49 2:52 | HDOT: -5.8 FPS | | | | | | FPR: 3519 | anvils within 20 NM. KSC AOA1 and NOR AOA2 were forecast |
| ULF | | | | | | | | | | FUEL BIAS: 825 | and observed NO-GO for thunderstorms within 20 NM. KSC |
| | | SS EVA 92 | NEG RETURN: | BRK INIT: 100 KGS | | | | | | FINAL TDDP: 2290 | PLS3 was forecast GO but observed crosswind of 19 knots. |
| | | DOCKED QUEST EVA 15 | 3:58 4.02 | DDAG CUUTE | | | | | | RECON: N/A | were forecast and observed GO. Weather scrub for KSC RTIS |
| | 2 | EMU/TETHERED EVA 85 | PTA (U/S 160): | DRAG CHUTE JETTISON: | | | | | 100 | (sensor fail) | AOA1 and PLS3. |
| | | SCHEDULED EVA 86 | 5:48 5:42 | 54 KGS | | | | | | 544,0450 | - Scrubbed Sunday 7/2/2006 launch attempt at 183: 17:14Z (at |
| | TION LOW | DURATION 7:31 | 50 | 198:13:15:18 Z | | 1000 | | | with the | PAYLOADS: | AOA1 and PLS3. Scrubbed Sunday 7/2/2006 launch attempt at 183: 17:14Z (at L-2h12m). The window opened at 183:19:21:09Z and closed at 183:19:31:09Z. The preferred launch time was 183:19:26:09Z. At the time of the scrub, there remained 7m41s to window closure. KSC RTLS was forecast NO-GO thunderstorm anvils within 20 NM and chance of broken 3000 ft and observed thunderstorms within 20 NM. KSC AOA1 was forecast NO-GO for thunderstorm anvils within 30 NM and chance of broken 3000 ft and observed thunderstorms. NOR AOA2 was forecast NO-GO for chance of thunderstorms within 30 NM and observed GO Primary TAL site Moron and alternate Istres (FMI) were forecast and observed GO. Zaragoza was forecast slight chance of thunderstorms within 20 NM but observed GO. All three TAL sites were observed GO. Weather Scrub - KSC RTLS, AOA. Management made the decision to go for a 48-hour turnaround |
| COGISTI | ics | CC EVA 02 | SE TAL (FMI 104): | | 16 | 100 | | | 23/6 | PLB: ISS ULF1.1 | At the time of the scrub, there remained 7m41s to window |
| | | SS EVA 93 | 606 6:17 | BRK DECEL FPS ² : | 100000 2 - | 4 | | | | ICC | closure. KSC RTLS was forecast NO-GO thunderstorm anvils |
| | | DOCKED QUEST EVA 16 EMU/TETHERED EVA 86 | DTM (IJ/C 170): | AVE 5.6 PK 6.7 | THE REAL PRINCIPLE | 1 | | 1 | | MPLM | within 20 NM and chance of broken 3000 ft and observed |
| | | SCHEDULED EVA 87 | PTM (U/S 160): 6:34 6:45 | WHEELSTOP: | and the same | | | 1 | | LMC | tnungerstorms within 20 NM. KSC AOAT was forecast NO-GO |
| | XPE | DURATION 6:47 | | 198:13:15:56 Z | IT THE ARE | | | | | RMS, ODS, OBSS | ft and observed thunderstorms. NOR AOA2 was forecast NO- |
| | DITION | 5510111010 0.47 | SE PRESS 104: | 12238 FT | | | V | | | | GO for chance of thunderstorms within 30 NM and observed GO |
| | T GO | SS EVA 94 | 7:04 7:12 | | | | | | 1 | MIDDECK: ISS ULF1.1, | Primary TAL site Moron and alternate Istres (FMI) were forecast |
| | | DOCKED QUEST EVA 17 | MEGO OMB | ROLLOUT: | VALUE OF STREET | BUTTO | W. | | 47-4 | ISS ULF1.1, | and observed GU. Zaragoza was forecast slight chance of thunderstorms within 20 MM but observed CO. All three TAI. |
| | | EMU/TETHERED EVA 87 | MECO CMD: 8:29.8 8:30.1 | 8965 FT 74 SEC | 905013E48774 | | | | | RAMBO, MAUI | sites were observed GO Weather Scrub - KSC RTI S AOA |
| | | UNSCHEDULED EVA 7 | 8:29.8 8:30.1 | 14 SEC | ISS013-E-4 | 18774 | - Disc | coverv | | | Management made the decision to go for a 48-hour turnaround |
| Section 1 | Siller | DURATION 7:11 | | | approaches | s ISS for | dock | ing with | | 5 CRYO TK SETS 6 GN2 TANKS | so the fuel cell cryos could be topped off for a possible 1-day |
| REITE | ER | | | | Looparda | Aultinum | acc.I | ogistics Mod | lulo | RMS 72 USED FOR | so the fuel cell cryos could be topped off for a possible 1-day extension, power permitting. KSC RTLS/AOA/Launch weather |
| | | | | | (MADINA) | nullipulpu | USE L | ogistics ivido | iule | OBSS/LDRI | scrub. |
| | | | | | (MPLM) in | tne paylo | ad ba | ay. | | ACTIVITIES | Continued |
| | | | 1 | <u> </u> | | | | | | <u> </u> | Continued |

SRB

RSRM

AND

ET

INC

SSME-TL **NOM-ABORT**

EMERG

THROTTLE

PROFILE

ENG. S.N.

| FLT ORBITER NO. | CREW (7) TITLE, NAMES & EVA'S | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS |
|--|--|--|--|
| Continued Continued Final Part of the Continued o | MCC WHITE FCR (45) FLIGHT DIRECTORS: VE - Steve Stich D/O 1 - Anthony Ceccacci D 2 - Norman Knight PLNG - Paul Dye MOD - Phil Engelauf SS: | Continued VI: 25819 25821 HaHp: 123.6 x 31.1 OMS-2: 38:00 98.1 FPS 98.6 FPS | Continued WINDS: 21008 P10 AVE: 5H, 7R PEAK: 6H, 8R DENS ALT: 1691 FT FLT DURATION: 12:18:36:47 OV-103: 263:14:49:45 S/T: 1058:04:03:42 DISTANCE: 5,293,923 sm |



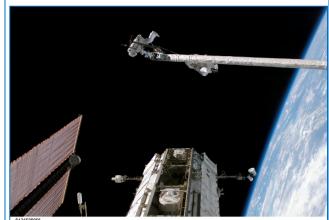
ORBIT

HA/HP

STS121-E-05156 (4July 2006)--- ET was photographed by orbiter umbilical well camera for damage studies by ground experts.



S121-E-06239 --- STS-121 (green shirts) & Exp 13 crews in ISS Destiny Lab. From left (front row): Reiter/FE13 (ESA), Exp 13 CDR Pavel V. Vinogradov/RSA, & Jeffrey N. Williams/FE13. From the left (middle row): Wilson/MS, CDR Lindsey, & Nowak/MS. From the left (back row): Sellers/MS. Fossum/MS. & PLT Kellv.



STS-E-06058 (8 July 2006) --- Fossum and Sellers test the Shuttle RMS and the OBSS as a platform for making repairs to a damaged orbiter.

Continued...

PAYLOAD

WEIGHTS,

PAYLOADS/

EXPERIMENTS

FSW

LAUNCH WINDOW:

- The July 4th Iaunch window opened at 185:18:32:55Z and closed at 185:18:42:56Z giving a total window of 10 minutes plus 1 second. The Preferred Launch Time (In-Plane Time) was 185:18:37:55Z.

MISSION HIGHLIGHTS

(LAUNCH SCRUBS/DELAYS,

TAL WEATHER, ASCENT I-LOADS,

FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

Performance close time was 185:18:41:38Z, giving a launch window of 3m43s.

EAUNCH DELATS.

None. Launch occurred on time at 185:18:37:55Z (2:37:55 PM EDT) on Tuesday, July 4, 2006. SLF crosswinds were forecast at 16 knots but STA evaluation raised RTLS crosswind limit to 17 knots. All three TAL sites were forecast GO but Zaragoza was observed NO-GO for showers within 25 NM.

- MRN (Primary TAL), Istres, and Zaragoza were all three forecast GO. Zaragoza was observed NO-GO for showers within 25 nm.

PERFORMANCE ENHANCEMENTS:
- Standard Set plus (1) PE Low Q SUM/JUL, (2) OMS Assist, (3) 52 NM MECO, (4) Del Psi

FLIGHT DURATION CHANGES/LANDING:

FLIGHT DURATION CHANGES/LANDING:

Total flight extension is 1 day.
On FD4*, MMT made decision to extend flight 1 day (from 12+1+2 to 13+2) to permit additional EVA to accomplish RCC/title repair materials DTO's. The plan was to land at one of the two EOM opportunities at KSC: (1) Deorbit 202 with landing on orbit 2023 (2) Deorbit 203 with landing on orbit 204. EDW was not called up. If unable to land at KSC on EOM, EDW would be called up for a "pick 'em?" KSC or EDW. TD 6-hr weather forecast for Deorbit 202 chance of showers within 30 nm. The weather forecast update at 1155Z removed showers within 30 nm and detached anvils were removed from the forecast changing the forecast to GO for deorbit. (Deorbit 203 forecast showers within 30 nm)

Deorbit burn was at 198:12:06:55Z with KSC runway 33 as the preferred runway. At EI-15, an unexpected rain shower moved toward the SLF that was expected close to HAC for runway 33 by touchdown. Re-designated from runway 33 to runway 15 at M15 (185,000 feet) to avoid the weather buildup south of the SLF. MLG touchdown was at 198:13:14:42Z (9:14:42 AM EDT) on Monday July 17, 2006 for a flight duration of 12:18:36:47. NLG touchdown was at 198:13:14:53Z. There were no further flight duration changes. Total 1 day extension for operations.

flight duration changes. Total 1 day extension for operations.

EIGHTH SHUTTLE CREWMEMBER REPLACEMENT

- Carlos Noriega (medical issue) was replaced by Sellers in July 2004. (6th & 7th Shuttle crewmembers replacements occurred on STS-113.)

RENDEZVOUS # 63: Rendezvous and dock with ISS

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE FNG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |

STS-121/ ULF1.1

Continued.



S121-E-06199 (10 July 2006) --- Fossum and Sellers (partially out of frame) restored ISS Mobile Transporter rail car to full operation and delivered a spare cooling system pump.



In JSC MCC Chris Lessmann/Entry Console Operator/USA (foreground) reviewing abort entry performance predictions and John Davidson/Abort Support/USA updating the Abort Region Determinator for DOL winds & atmosphere.



JSC2006-E-27890 --- Orbit-1 Flight Control Team group portrait in the Shuttle White Flight Control Room of JSC MCC. Flight Director Tony Ceccacci holds the STS-121 mission logo.

SIGNIFICANT ANOMALIES:
- L5L thruster heater fail off (first launch attempt)
- ET LH2 5% fill-point sensor failed wet when commanded to dry state

(during loading attempts) FES Full up PRI B Shutdown

- FES Full up PRI B Shutdown
- Profruding Gap Fillers
- Personal hygiene hose leak
- TPS Blankef Damage
- 85-ft safety tether #24 retraction issue
- Scratch reported on crewlock external hatch sealing surface
- SAFER 5000 (EV1) unlatched during EVA. Relocked by EV2
- ADL1 EUG Tank Le

APU 1 Fuel Tank Leak
APU 3 GG/FU Pump Heaters cycling in over temp range
Two-inch spatula inadvertently released during EVA 3
Waste Dump Nozzle Temps A&B unusual signature during condensate - Waste Dulin Nozzas (Singer Line)
- Right Air Data Probe initial fail to deploy
- WLEIS Inadvertent Software Shutdown (GFE)
- MCC GNC ISP Server Issue
- DOLILU PLOAD Procedural error (PLOAD LOX estimate high)

Continued...

- First flight of an ET without the Protuberance Air Load ramps as a safety improvement to reduce potential for debris.

- Eirst test of 50-ft robotic arm boom extension as a work platform.

First test of 50-ft robotic arm boom extension as a work platform.
First flight with hardened tiles on NLG doors.
First use of SRMS/OBSS/Laser Dynamic Range Imager (LDRI) to scan Orbiter WLE and Nose Cap (RCC).
DTO 848 RCC crack repair tasks using caulk guns to dispense the NOAX (non-oxide adhesive experimental) material.
First flight of Orbiter MLG with four new larger, smoother tires that can withstand higher loads at landing.
New procedures developed to ensure gap fillers between heat-shielding tiles stay in place (5000 replaced prior to launch).
First flight to take GPS to NAV (BFS). Incorporated after processing TACAN approx. 140K. Performed well.
ISS has three crew members for first time since May 2003.

ET Separation at 185:18:46:46Z, 000:00:08:51 MET. OMS-2 ignition at 185:19:15:55Z, 98.7 fps, resultant orbit 124.4

TI ignition 187:12:04:46Z, 16.8 seconds, resulting orbit 190.1 by 177.9 nm.

177.9 nm.
SRMS/OBSS/Laser Dynamic Range Imager (LDRI) scanned both WLE and nose cap, no anomalous conditions identified.
ISS captured at 187:14:51:45Z (1:20:13:49 MET).
Hard dock at 187:15:10:28Z (1:20:32:33 MET).
ISS Hatch Open at 187:16:29Z (1:21:51 MET). Welcomed by Expedition 13 two-person crew (Vinogradov and Williams).
IELK Seat Liner transfer at 187:19:13Z (002:00:35:05 MET which is Reiter's Shuttle time). This is the official transfer of Thomas Reiter from Space Shuttle STS-121 crew to ISS Expedition 13 crew. ISS crew increased to three persons for first time since May 2003.

NIAY 2003.
Leonardo MPLM grappled and installed on Unity Module.
EVA 1 Start at approximately 3/18:38 MET (189:13:15:55Z) July
8. Duration 7h 31m. Blade blocker inserted into Zenith IUA of
MS, OBSS/SRMS Characterization. Rerouted TUS cable. EVA from ISS Quest A/L.

TOM ISS Quest A/L.

EVA 2 Start at approximately 5/17:36 met (191:12:13:55Z) July
10. Duration 6h 47m. Nadir IUA R&R, Pump Module (WFGB)
transferred from ICC to ESP-2, R&R TUS. Piers' SAFER
became detached, Mike re-locked it.

EVA 3 start 193:11:20:30Z (7:16:42:35 MET), July 12. Duration
7h 11m. Completed 5 samples of NOAX DTO & IR imaging.
Grapple Bar transferred to ISS.

Grappie Bal italisteried to ISS.
STS-121 crew farewell to ISS crew (Commander Pavel
Vinogradov, Flight Engineers Jeffrey Williams & Thomas Reiter).
APAS Hatch Close at 10/13:36 MET, ODS Hatch close 10/13:38
MET (196:08:15:55Z).

STS-121 Undock from ISS at 10/15:29 MET, 196:10:06:55Z.
Total consumables transferred from Orbiter to ISS: Water
1545.8 lbm (1454.9 lbm in 15 CWC's and 90.9 lbm in 4 PWR's);
N2 74.2 lbm transferred to Joint Air Lock tanks. No oxygen transferred between tanks.

Cargo transferred from Orbiter to ISS total 10903.35 lbs (7423.99 from MPLM, 1862.93 from Middeck, 1616.43 from ICC).
Cargo transferred from ISS to Orbiter total 6450.92 lbs (4389.14 plus unplanned 241.52 lbs to MPLM and 1820.26 lbs to Middeck).

No communications blackout during entry.

| | | | OI . | ACE SHO | <i>,</i> , , , , , | WIIOC | | 140 00 | | | ŭ |
|---------------------------------------|---|---|---|--|------------------------------|--|--------|--|--------|------------------------------------|--|
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
| | | (6) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (0) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | Q EVA S | | WINDS | ENG. S.N. | | | | | | |
| STS-115/ | OV-104 | CDR: | KSC 39B 252:15:14:55 Z 11:14:55 AM EDT (P) 11:14:55 AM EDT (A) | KSC 33 (KSC 63) 264:10:21:23 Z | 104/104/109% | BI-127 | | DIRECT | OI-30 | CARGO: | Brief Mission Summary: STS-115/12A (19th ISS mission), for |
| ISS 12A | (Flight 27) | Brent W. Jett | 252:15:14:55 Z | 264:10:21:23 Z 6:21:23 AM EDT | PREDICTED: | RSRM | (19) | INSERTION | (3) | 41848 LBS | the first time since late 2002, resumed assembly of the ISS. |
| | Atlantis | (Flt 4 - STS-72, STS-81, | 11:14:55 AM EDT (P) | 0:21:23 AIVI EDT Thursday 10 | 100/104.5/ | 94 | | POST OMS-2: | | DAVIOAD | Atlantis left ISS with a new, second pair of 240-foot solar wings attached to a new 17.5-ton truss segment P3/P4 with |
| SEQ FLT# 116 | OMS PODS: | ŠTS-97) P711/R206/V132/M179 | Saturday 5 | 9/21/06 (11) | 104.5/72 | / - | | 154.0 NM X | | <u>PAYLOAD</u> CHARGEABLE: | batteries, electronics, and a giant rotating joint for sun |
| FL1# 116 | LPO4- | 1711/10200/ 132/101177 | Saturday 5 9/9/06 (11) | | 104.5 | ET-118 | | 123.8 NM | | 35758 LBS | tracking. The new solar arrays would double the ISS on- board power when the electrical systems were brought |
| KSC 116 | RPO | PLT: | LALINGLUMINDOM | DEORBIT BURN: 264:09:14.23 Z | A CTUAL. | SLWT | | | | 00700 250 | board power when the electrical systems were brought |
| 130 110 | FRC4-27 | Christopher J. Ferguson P712/R300/M261 | <u>LAUNCH WINDOW</u> : 4M41S (PLT in- | 204:09:14.23 Z | ACTUAL: 100/104.5/ | 24 | | | | DEPLOYED: | online during the STS-116 mission to follow. |
| PAD 39B-52 | | P712/R300/IVI261 | plane) | XRANGE: 225 NM | 104.5/72 | 27 | | | | 35552 LBS | KSC W/D: OPF 264, VAB 7. PAD 41 = 312 days total. |
| | | MS1/EV1: | 5011510 1/00 | | 104.5 | | | | | NON-DEPLOYED: | , |
| MLP-2 | | Joseph R. Tanner | EOM PLS: KSC TAL: MRN | ORBIT DIR: AL 35 | 1 = 2044 (9) | СТ | | | | 0 LBS | LAUNCH POSTPONEMENTS: |
| 19TH | | (Flt 4' - STS-66, STS-82, STS-97) | TAL WX: ZZA, FMI | AIM PT: NOMINAL | 2 = 2044 (9) | <u>IMPACT</u> | | | | | - Baselined OV-104 launch date of 4/10/03 on 3/7/02 |
| SHUTTLE | | P713/R185/V136/M162 | , | <u></u> | 2 = 2048 (6) 3 = 2047 (9) | | | DEORBIT: | | MIDDECK: 206 LBS | Postponed launch date to 5/23/03 on 10/8/02; delays due to engine crack repairs |
| FLIGHT TO | | | SELECTED: | MLGTD: 3131 FT | All O Dissisti | MET | | HA 190 NM HP 179 NM | | 206 LBS | - Postponed launch date to NET 8/21/03 on 3/13/03 |
| ISS | | MS2/EV2: | RTLS: KSC 33/N/N | 264:10:21:23 Z VEL: 191 KGS | All 3 Block II Engines | 1:13:36 | | HP 1/9 NM | | SHUTTLE | - Postponed launch date to NET 8/21/03 on 3/13/03 - Postponed launch date to NET 10/30/03 on 4/17/03 |
| | | Daniel C. Burbank (Flt 2 - STS-106) | AOA: KSC 33/N/N | 189 KFAS | Liigiiics | LAT: | | | | ACCUMULATED | - Postponed launch date to NET 1/22/04 on 5/28/03 |
| BURBA | NK S | P714/R258/V183/M225 | PLS: EDW 22/N/N | HDOT: -1.5 FPS | | 37.58S | | ENTRY | | WEIGHTS: | - Postponed launch date to NET 7/24/04 on 7/29/03 - Postponed launch date to NET 2/10/05 on 10/3/03 |
| ali . | FARE | | TDEL. | TD NORM 195: | M 3 EOM: WEIGHT: | LONG: | | VELOCITY: 25867 FPS | | | - Postponed launch date to NET 2/10/05 on 3/22/04 |
| | | MS3/EV3: Heidimarie M. Stefanyshyn- | <u>TDEL</u> : 0.10 .062 | 2639 FT | 199711 LBS | 160.16 W | | | | DEPLOYED: 1275483 LBS | - Postponed launch date to NET 12/8/05 on 10/29/04 |
| Nos! | N S S S S S S S S S S S S S S S S S S S | Piper | | | X CG: | | | ENTRY RANGE: 4378 NM | | 12/0483 LBS | Postponed launch date to NET 8/28/05 on 3/22/04 Postponed launch date to NET 12/8/05 on 10/29/04 Postponed launch date to NET 2/16/06 on 5/23/04 |
| ERG | | P715/R301/F40 | MAX Q NAV: | DRAG CHUTE | 1084.99 | | | RANGE: | | NON-DEPLOYED: | I- Postponed launch date to NET 7/1/06 on 10/31/05 |
| E | A | MCA/EVA: | 731.36 723.09 | DEPLOY: 181 KEAS | | | | 4378 INIVI | | 1568738 LBS | - Changed launch date to TBD on 11/15/05 - Changed launch date to NET 8/28/06 on 3/16/06 |
| * | \$ | MS4/EV4: Steven G. MacLean | SRB STG: | 264:10:21:26 Z | <u>LANDING</u> : WEIGHT: | | | | | | - Advanced launch to 8/27/06 on 8/3/06 (actual launch date was |
| | | (Flt 2 - STS-52) P716/R156/V184/M138 | 2:05 2.08 | NI OTO F775 FT | WEIGHT: | | | | | CARGO TOTAL: 3665444 LBS | 9/9/06) |
| 1159 | | P716/R156/V184/M138 | PERF: NOMINAL | NLGTD: 5775 FT | 199642 LBS X CG: | | | | | 3003444 LD3 | |
| | | (CSA-Canada) | I LIXI. NOMINAL | 264:13:21:32Z VEL: 158 KGS | 1086.98 | | | | | PERFORMANCE | LAUNCH SCRUBS: |
| | | | 2 ENG TAL (MRN): | 156 KEAS | | | | | | MARGINS (LBS): | Scrubbed Sunday, 8/27/06 launch scheduled for 4:30 PM EDT at approximately L-26 hours to allow all Shuttle elements time to |
| | | SS EVA 95 | 2:42 2:47 | HDOT: -6.4 FPS | | | | | / | FPR: 2886 | evaluate the lightning strike on Pad 39B on 8/26. Technical |
| 50 ISS | 12A * | DOCKED QUEST EVA 18 | NEG RETURN: | BRK INIT: 107 KGS | 1 | The same of the sa | | | | FUEL BIAS: 921 FINAL TDDP: 1749 | scrub. Launch rescheduled to NET 8/28/06 at 4:04 PM EDT. |
| SIM | * | EMU/TETHERED EVA 88 SCHEDULED EVA 88 | 3:52 4.00 | | 4 | | | | mus 50 | RECON: 349 | The Saturday, 10:00 PM EDT MMT decision was to spend |
| 2// | | DURATION 6:26 | DTA (II/C 155): | DRAG CHUTE | 10 | | | | Man | | another day analyzing the probability of damage to the SRB pics. The launch countdown was to continue for a NET Tuesday 8/29 |
| * | | | PTA (U/S 155): 5:16 5:26 | <u>JETTISON</u> : | | 4 | | | A | PAYLOADS: | launch |
| | | SS EVA 96 | | 63 KGS 264:10:21:53 Z | | VI Jak | 1 | 1 | | <u>PLB</u> : ISS 12A | Scrubbed Tuesday, 8/29/06 launch at approximately L-37 hours based on a KSC forecast of 50 knots, gusts to 65 with a potential of reaching the Pad maximum of 70 knots due to Tropical Storm Ernesto. Decision made at 3:45 AM EDT on 8/29/06 morning to |
| 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | | DOCKED QUEST EVA 19 | SE TAL (FMI 104): | | | 2000 | # | 1 | 1 | (P3/P4) Segment | based on a KSC forecast of 50 knots, gusts to 65 with a potential |
| * SIS | -115 * | EMU/TETHERED EVA 89 SCHEDULED EVA 89 | 6:09 | BRK DECEL FPS ² : AVE 5.8 PK 8.5 | - 40 | | | The state of the s | | (i o/i +/ ocginent | of reaching the Pad maximum of 70 knots due to Tropical Storm |
| | | DURATION 7:11 | PTM (U/S 575): | AVE 3.0 FK 0.3 | | | | 100 | | MIDDECK: | roll back to the VAB with option to stop and reverse the rollback |
| | | | PTM (U/S 575): 6:19 6:24 | WHEELSTOP: | | | | - | 1000 | RAMBO, MAUI, | if the forecast improved. Rollback to VAB started at 10:04 AM |
| | EXPEDITIO | SS EVA 97 | CE DDECC 104. | 264:10:22:15 Z | | | | | | RMS, ODS, OBSS | FDT The 11 AM forecast was in fact improved KSC would |
| | | DOCKED QUEST EVA 20 | <u>SE PRESS 104</u> : 7:00 | 10670 FT | | | | | | 5 CRYO TK SETS | sustain winds of less than 45 knots with gusts to 60 knots that is within the pad limit of 70 knots mph. The STS-115 stack was midway between Pad B and the VAB at 2:45 PM EDT when the |
| | | EMU/TETHERED EVA 90 SCHEDULED EVA 90 | | ROLLOUT: | 155013E79714 | | | | | 5 N2 TANKS | within the pad limit of 70 knots mph. The STS-115 stack was |
| | | DURATION 6:42 | MECO CMD: | 7539 FT | ISS013-E-7 | 79714A | tlanti | s, carrying a | | RMS 73 | decision was made to stop the Rollback and return the stack to |
| | - 8 | · · · · - | 8:23.7 8:24.8 | 52 SEC | crew of six | | | | | RMS USED FOR | Pad B. The launch date is under assessment. Weather Scrub. |
| 6 | S S S S S S S S S S S S S S S S S S S | | | | outpost wit | | | | | OBSS/LDRI | Rescheduled launch to 11:29 AM EDT on 9/6/06. |
| 4 | N. S. | | | | continuing | | | | | SURVEYS AND | Continued |
| | | Continued | | | Continuing | | .5.10 | 55. | | UNBERTH P3/P4 | Continued |
| | | | | | | | | | | | |

| ST: | S-115/ S 12A | | Continued MCC WHITE FCR (46) | Continued | Continued WINDS: 2H, 3R | | | | - | | Continued LAUNCH SCRUBS: (continued) |
|-----|-----------------|---------|------------------------------|-------------------------------|---|----------------------------------|-------------|-----------|-----|--------------------------|--|
| | NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |

25819 25818 FLIGHT DIRECTORS: SHUTTLE: OFFICIAL: 2H, 3R A/E - J. S. Stich LD/O 1 - P. F. Dye O 2 - C. A. Koerner 0303P04 37:20.7 222 FPS 220.7 FPS DENS ALT: 696 FT O 3/PLNG - B. C. Lunney MOD -FLT DURATION: 11:19:06:28 LD/O 2 - J. A. Mccullough O 1 - K. B. Beck O 3/PLNG - K. L. Alibaruho S/T: 1069:23:10:10 OV-104: 231:16:32:28 DISTANCE: 4,910,268 sm



ISS013-E-81630 --- Crews in ISS Destiny Lab: Exp 13 from the left (front row): Thomas Reiter/FE (ESA), CDR Pavel V. Vinogradov (RSA), & Jeffrey N. Williams/FE. STS-115 from the left (second row): Tanner/MS. Stefanyshyn-Piper/MS, & CDR Jett; and from the left (top row): PLT Ferguson, Burbank/MS, & MacLean/MS (CSA).



JSC2006-E-40208 --- Mike Suffredini, ISS Program Manager, responds to a question from media during STS-115 mission update briefing on Sept. 14, 2006, at JSC. Shuttle Flight Director John McCullough is at left.

Scrubbed Wednesday, 9/6/06 launch at approximately L-8.5 hours due to a fuel cell 1 coolant pump phase A short. (Pump operated on two phases.) 24-hour scrub turnaround with MMT at 1 PM 9/6 to decide launch date. The MMT decision was to press for a launch attempt on Friday, 9/8. Plan was to keep

Phase A cb open during ascent. Technical scrub.
Scrubbed Friday, 9/8/06 launch attempt at 251:14:53Z while holding at T-9 minutes when ET LH2 ECO Sensor #3 indicated failed wet when actually sensor was dry. 24-hour scrub turnaround. ECO sensor operated normally during drainback and on Saturday launch day. GO for launch. Technical scrub.

LAUNCH WINDOW:
- The 9/9/06 launch window opened at 252:15:10:39Z and closed at 252:15:19:36Z for a total launch window of 9 minutes 0 seconds. The Preferred Launch Time (In-Plane time) was 252:15:14:55Z giving a launch window of 4m41s.

None. Launch occurred on time at 252:15:14:55Z (11:14:55 AM EDT) on Saturday, September 9, 2006.

TAL WEATHER:

Zaragoza and Moron were forecast NO-GO for thunderstorms within 20. FMI was forecast with a 1-knot tailwind violation (average tailwind forecast to be 11 knots and peak tailwind forecast to be 16 knots). Zaragoza was observed NO-GO for thunderstorms and attached anvil. MRN and FMI were both observed GO at TAL landing time. Moron was selected as Prime TAL site.

PERFORMANCE ENHANCEMENTS:
- Standard set plus (1) PE Operational High Q SUM/AUG, (2)
OMS Assist, (3) 52 NM MECO, (4) Del Psi, (5) Non-standard consumables reduction.

FLIGHT DURATION CHANGES/LANDING

EOM landing was planned for 263:13:04Z on 9/20/06 at KSC. However, during INCO survey of the orbiter after FCS checkout, However, during INCO survey of the orbiter after FCS checkout, an unidentified piece of debris was observed in Camera A. Tuesday 9/19/06 MMT decided to investigate the significance of the debris. The MMT extended the flight 1 day to allow time to perform RMS and OBSS surveys. The RMS and OBSS surveys of the PLB, both WLE and flight control surfaces using the RMS elbow camera, did not identify the debris. Atlantis was cleared for landing on EOM +1 day. Deorbit burn occurred at 264:09:14:23Z (11/17:59:28 MET) Orbit 185. Main Landing Gear touchdown on KSC Runway 33 was at 264:10:21:23Z (6:21:23 AM EDT) on Thursday, 9/20/06 for a flight duration of 11/19:06:28. Nose Landing Gear touchdown was at 11/19:06:28. Nose Landing Gear touchdown was at 264:10:21:32Z. Landing winds were forecast 03003P05 and observed 0303P04 (2H, 3R). Total flight duration extensions of 1 day (technical extension).

Continued



S115-E-05623 (12 Sept. 2006) --- Piper, releases the restraints on the forward Solar Array Blanket Box (SABB) during EVA with Tanner, partially visible at top edge of frame.

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|-------------------------|-------------------------------|--|-------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, | THROTTLE PROFILE | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |

STS-115/ ISS 12A

Continued.



S115E05801

S115-E-05801 (13Sept. 2006) --- Burbank (red leg stripes) and MacLean/CSA (above & right) complete activation of SARJ.

Continued..

RENDEZVOUS # 64: Rendezvous and dock with ISS

SPACE SHUTTLE NIGHT LANDING: 21 (landed on runway

FIRSTS/LASTS/NEW:

Used Airlock Campout Prebreathe Protocol for the first time. Crew spent sleep period isolated in the JAL (Quest Airlock) at reduced pressure of 10.2 psia.

- Max Q at 252:15:15:45Z (00m50s)
- OMS Assist ignition was 252:15:17:08Z with burn duration of
- OMS-2 ignition was at 252:15:52:16Z (37:21 MET), burn duration 2m25s
- TI at 254:08:08:08Z
- SRMS/OBSS/LDRI survey of nosecap, port, and starboard wing RCC on FD2

- ISS Docking capture at 254:10:48:27Z, 1:19:33:32 MET Docking complete at 254:11:01:01Z, 1:19:46:06 MET ISS Hatch Open at 1d21h19m; ISS crew welcoming
- EVA 1 Crew began campout in ISS Airlock at 10.2 psia in prep
- EVA 1 Start at 255:09:19Z (3/18:01 MET) on 9/12/06, conducted from the ISS JAL (Quest Airlock). The astronauts used a new prebreathe protocol first tested during the handover of prebreathe protocol first tested during the handover of Expedition 12. EV1/Joe Tanner and EV2/Heidimarie Piper spent the night isolated in the JAL (Quest Airlock) with a reduced pressure of 10.2 psi while the ISS remains at 14.7 psi. This prebreathe protocol is called Prebreathe Campout Protocol (PBCOP). The Integrated Truss Segment (ITS) P3/P4 was attached to the Port 1 (P1) segment using the SSRMS. EVA crew connected power cables, released SABB and BGA restraints to prepare SARJ for operations. During removal of launch lock cover, a bolt/spring and a washer were accidentally released and lost. The EVA duration was 6:26 released and lost. The EVA duration was 6:26. EVA 2 Start at 256:09:18Z (4/17.51 MET) on 9/13/06,. EV3/Dan
- Burbank and EV4/Steven MacLean slept in the JAL for Spacewalk Prebreathe Campout Protocol. They completed preparations for the activation of SARJ for operations. EVA 2 duration was 7:11.
- EVA 3 Start at _____. EV1/Tanner and EV2/Piper used PBCOP protocol. They completed P3 and P4 tasks, R&R SASA on Z1 truss, and installed heat shield on Ku-band antenna group interface tube. The EVA duration was 6:42.
 Hatch closed at 7/19:27 MET after saying goodbyes to
- Expedition 13 crew.

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|--------------|-------------------------------|--|-------------------------------|-------------|-----|-------|-----|---------------------|--|
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, WINDS | PROFILE FNG S N | El | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |

STS-115/ ISS 12A

Continued.



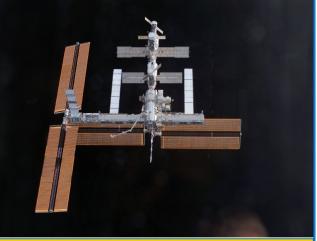
S115-E-05493 (11 Sept. 2006) --- ISS Configuration prior to docking of STS-115.



JSC2006-E-40475 --- STS-115/12A ISS Orbit 2 flight control team portrait in the MCC. Flight Director John McCullough (center right) holds the STS-115 mission logo and CAPCOM Pamela A. Melroy holds the STS-115/12A mission logo.



JSC2006-E-40599 --- Flight Director Bryan Lunney monitors data at his console in MOCR.



S115-E-06741 (17 Sept. 2006) --- ISS Configuration after undocking of STS-115

Continued..

EVENTS: (continued)

- Allantis undocking completed at 260:12:49:50Z, 7/19:27 MET

 Total cargo transferred from Atlantis to the ISS was 36678 lbs (included 35552 lbs for P4/P5, but excluding water)

 Total cargo transferred from ISS to Atlantis was 993 lbs

 Total consumables transferred from Atlantis to ISS was 1110.5 lbm of water (11 CWC's with 1043.8 lbm and four PWF's with 66.1 lbm). Total oxygen transferred to ISS was 103 lbm.

- SIGNIFICANT ANOMALIES:
 Fuel Cell 1 Coolant Pump AC1 Phase A short caused launch scrub. (See Launch Scrubs.)
- ARD response to erroneous telemetry (ARD NO-GO) Elevon Positioning Procedure callout errors

- ASA 3 Speedbrake driver channel # erratic Starboard PLBD aft (B) closed indication ON should be OFF
- F4D Tyvek cover latè release
- TPS tile and blanket anomalies (cleared for Entry)
- FES shutdown during Ascent
 Water supply dump line heater A abnormal temperature cycling
 Hydraulic System 3 TVC Pitch Actuator indication
 Water supply dump valve leak
 Sequential Stills Video failure

- Sequential Stills Video failure
 APU 2 X-axis accelerometer data erratic
 S-band lower right antenna communication problems
 FES topping left duct sensor erratic/OSL
 MADS BITE indication on FDM 2 MUX D
 Nosecap expansion seal RCC damage
 Engine 2 LO2 inlet pressure transducer reading low

- R4R heater failed on Aft sample bottles L1 and R2 leaking Starboard radiator MMOD strike

| STEEL DISCOVERY TILL STEEL DISCOVERY TILL STEEL DISCOVERY TILL TIL | | | | OI | ACE SH | | WIIOC | | 10 00 | | | |
|--|---------------------------------------|---|--|---|---|--|---|---|---|-----|--|--|
| NO | FLT | ORBITER | | | RUNWAY, | NOM-ABORT | | | ORBIT | FSW | | |
| CST-ST-16 OV-193 CST-ST-16 CST-ST-16 OV-193 CST-ST-16 C | NO. | | | | FLT DURATION, WINDS | PROFILE | | INC | HA/HP | | | |
| PAD 398-53 MS1: MS2: MP patrick File 2- STS-100 MS priviled (P1 in plane) MS priviled (P1 in plane) MS2: MS2: MS2: MS3: | ISS 12A.1 SEQ FLT# 117 | (Flight 33) DISCOVERY OMS PODS: LPO1-36 RPO3-34 | Mark L. Polansky (Fit 2 - STS-98) P717/R262/V185/M228 PLT: William A. Oefelein | 344:01:47:35Z 8:47:35 PM EST (P) 8:47:35 PM EST (A) Saturday (6) 12/09/06 (8) LAUNCH WINDOW: | KSC 15 (KSC 64) 356:22:31:58Z 5:31:58 PM EST Friday 14 12/22/06(15) DEORBIT BURN: | PREDICTED: 100/104.5/ 104.5/72 104.5 ACTUAL: | RSRM 95 ET-123 SLWT | (20) IN | NSERTION POST OMS-2: | | 35690 LBS PAYLOAD CHARGEABLE: 22502 LBS | (20th ISS mission) continued ISS construction with the delivery and installation of Integrated Truss Segment P5 and began the process of reconfiguration and redistribution of the power generated by the pair of U.S. solar arrays. P6 truss was relocated to its final assembly |
| MSLFLYZ Christif Euglesand (ESA) PSZ CD CD REAS DOT: 2.9 FPS DOR KEAS DOT: 2.9 FPS MSLFL | MLP-1 20TH SHUTTLE FLIGHT TO | | Nicholas J. M. Patrick (Flt 2 - STS-105) P719/R303/V186/M263 MS2/EV1: Robert L. Curbeam, Jr. (Flt 3 - STS-85, STS-98) | (PLT in-plane) EOM PLS: KSC TAL: ZZA TAL WX: MRN, FMI SELECTED: RTI S: KSC 33 N/N | XRANGE: 813 NM ORBIT DIR: AR 13 AIM PT: CLOSE IN MLGTD: 1825 FT | 104.5/74 104.5 1 = 2050 (5) 2 = 2054 (6) 3 = 2058 (1) ALL 3 SSME'S | MET 1:14:00 <u>LAT</u> : 36.83S LONG: | H H <u>E</u> V | HA 184.5 NM HP 168.1 NM ENTRY (ELOCITY: | | NON-DEPLOYED: 16572 LBS MIDDECK: 182 LBS | KSC W/D: OPF 105, VAB 8, PAD 28 = 141 days total LAUNCH POSTPONEMENTS: - Baselined OV-104 launch date of 06/05/2003 on 05/05/2002 - Postponed launch date to 07/24/2003 on 10/08/2002; delays due to engine flowliner crack repairs - Postponed launch date to NET 12/18/2003 on 03/13/2003. Slip |
| P723/R306/F42 MSS Down/EXP14: Thomas Reiler (MSS Up on STS-121) Thomas Reiler (MSS Up on STS-121) P724/R299/M260 MSS EVA 98 DOCKED QUEST EVA 18 EMU/TETHERED EVA 91 DURATION 6.36 SS EVA 99 DURATION 5.36 SS EVA 99 DURATION 5.00 SS EVA 100 DOCKED QUEST EVA 29 EMI/TETHERED EVA 93 DURATION 5.00 SS EVA 99 DURATION 5.00 SS EVA 90 DURATION 6.03 DURATION 6. | THE WASHINGTON | D. R.C. | MS3/EV2: Christer Fuglesang (ESA) P721/R304/M264 MS4: Joan E. Higginbotham P722/R305/F41 MS5 Up/EV3/EXP14: | AOA: NOR 17 N/N PLS: EDW 22 CI TDEL: 0:00 0.232 MAX Q NAV: 760 764 | VEL: 196 KGS 208 KEAS HDOT: -2.9 FPS TD NORM 205: 2015 FT DRAG CHUTE DEPLOY: 191 KEAS | M 3 EOM: WEIGHT: 226476 LBS X CG: 1077.4 in LANDING: WEIGHT: 224041 LBS | 137.14 | R | RANGE: | | ACCUMULATED WEIGHTS: DEPLOYED: 1281231 LBS NON-DEPLOYED: 1585492 LBS CARGO TOTAL: | Postponed launch date to NET 03/01/2004 on 04/17/2003. Slip due to Columbia accident. Postponed launch date to NET 05/13/2004 on 05/28/2003. Slip due to Columbia accident. Postponed launch date to NET 09/13/2004 on 07/29/2003. Slip due to Columbia accident. Postponed launch date to NET 04/14/2005 on 10/03/2003. Slip due to Columbia accident. |
| DURATION 6:36 SS EVA 99 DOCKED QUEST EVA 19 EMU/TETHERED EVA 92 DURATION 5:00 SE PRESS 104: 6:07 6:03 MKCO CMD: 8:22.32:312 MKCO CMD: 8:22.55 8:23.8 SEVA 101 DOCKED QUEST EVA 20 EMU/TETHERED EVA 93 SCHEDULED EVA 93 DURATION 7:31 SS EVA 101 DOCKED QUEST EVA 20 EMU/TETHERED EVA 94 SCHEDULED EV | | | P723/R306/F42 MS5 Down/EXP14: Thomas Reiter (M/S5 Up on STS-121) P724/R299/M260 SS EVA 98 DOCKED QUEST EVA 18 EMU/TETHERED EVA 91 | PERF: NOMINAL 2 ENG TAL (MRN): 2:31 2:28 NEG RETURN: 3:55 3:52 PTA (U/S 160): | NLGTD: 5594 FT 356:22:32:11Z VEL: 140 KGS 152 KEAS HDOT: -7.0 FPS BRK INIT: 79 KGS DRAG CHUTE | | - | | | | PERFORMANCE MARGINS (LBS): FPR: 2886 FUEL BIAS: 921 FINAL TDDP: 3768 RECON: 4559 PAYLOADS: | 12/09/2004 - Postponed launch date to NET 04/23/2006 on 05/23/2005. Slip reflected latest planning decisions. - Postponed launch date to NET 10/01/2006 on 10/31/2005. Slip reflected latest planning decisions. - Postponed launch date to NET 11/16/2006 on 03/16/2006. Slip reflected latest planning decisions. - Postponed launch date to NET 12/14/2006 on 04/04/2006. Slip reflected latest planning decisions. |
| MAUAI STIFE-USS04 View from Discovery STIFE-USS04 View from Discovery AFD of payload bay and approaching ISS (background) . Shown in PLB are shuttle's docking mechanism (foreground), Spacehab (partially obscured), Canadian-built RMS robotic MAUAI | 15 | | DURATION 6:36 SS EVA 99 DOCKED QUEST EVA 19 EMU/TETHERED EVA 92 SCHEDULED EVA 92 DURATION 5:00 SS EVA 100 | SE TAL (FMI): 6:07 6:03 PTM (U/S 160): 6:07 6:02 SE PRESS 104: | 52 KGS 356:22:32:36Z BRK DECEL FPS ² : AVE 5.3 PK 6.1 WHEELSTOP: 356:22:32:51Z | PURIM | | | | | ISS 12A.1 - ITS SPACEHAB SM ICC (W/STP-H2 UTILIZATION PAYLOAD) MIDDECK: ISS 12A.1 | - Scrubbed Thursday 12/7/06 EST launch (12/8/06 GMT day 242) while holding at T-5 minutes. The window opened at 342:02:30:48Z and closed at 342:02:40:48Z with a Preferred Launch Time of 342:02:35:48Z. TAL1 (ZZA) was forecast and observed GO at TAL landing time and was selected as Prime TAL site. TAL2 (MRN) was forecast NO-GO thunderstorms WI 20 NM and BKN30 and observed NO-GO BKN. TAL3 (FMI) |
| Continued DURATION 6:38 Continued | ZIV | KE | DOCKED QUEST EVA 20 EMU/TETHERED EVA 93 SCHEDULED EVA 93 DURATION 7:31 SS EVA 101 DOCKED QUEST EVA 21 EMU/TETHERED EVA 94 SCHEDULED EVA 94 DURATION 6:38 | 8:22.5 8:23.8 VI: 25819.0 25819.0 | 8155 FT 53 SEC | AFD of pay ISS (backg shuttle's do (foreground obscured), arm (right), | rload bay round) . : ocking me d), Spacel Canadiar and RMS | and ap Shown echanis hab (pa n-built l S/Orbit | oproaching n in PLB are om artially RMS roboti er Boom | c | MAUAI | Director counted down and held at 5 minutes until window closed. Scrubbed launch due to Range Safety violation of clouds below 6000 feet, thicker than 500 feet (verified at 5500 feet). MMT opted for a 48-hour turnaround and top off cryos and weather forecast was NO-GO. Launch date set for 12/09/06 EST (12/10/06 GMT). Weather Scrub |

| N | LT IO. | ORBITER | CREW (7) TITLE, NAMES & EVA'S | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS | SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N. | SRB RSRM AND ET | INC | ORBIT HA/HP | FSW | PAYLOA WEIGHT: PAYLOAE EXPERIME |
|--------------------------|-----------|---------|---|--|--|---|---|---|--|--|--|
| STS- ISS 1 Continu | 2A.1 | | Continued MCC WHITE FCR (47) FLIGHT DIRECTORS: SHUTTLE: A - J. S. Stich E - N. D. Knight LD/O 1 - A. J. Ceccacci O 2 - M. R. Abbott O 3/PLNG - R. E. LaBrode Team 4 - R. S. Jones MOD - P. L. Engelauf ISS: LD/O 2 - J. M. Curry O 1 - J. D. Hassmann O 3 - J. R. Montalbano TEAM 4/PLNG - D. J. Weigel CAPCOMS: SHUTTLE: A/E - K. T. Ham - C. J. Ferguson (Wx) LD/O1 - K. A. Ford | | Continued WINDS: 14H/2R Kts OFFICIAL: 159/14 14/2R Kts DENS ALT: 1229 FT FLT DURATION: 12:20:44:23 S/T: 1082:19:54:33 OV-103: 276:11:34:05 DISTANCE: 5,330,398 sm TOTAL SHUTTLE DISTANCE: 438,715,036 sm | S116-E-064 ISS Destiny 14FE/MS-Dr Oefelein. Fro Fuglesang/N (back row): 0 Tyurin/Exp1 | Lab. From Patrick om the lead of the lead | om the c/MS, eft (ce), & C o14 L | e left (front r Higginboth Inter row): C DR Polanslopez-Alegric | ow): R am/Ms curbea ky. Fro a, Mik | Reiter/Exp S, & PLT m/MS, om the left hail |
| | | | O2 - K. M. McArthur O3/PLNG - S. W. Lucid Team 4 PLNG - N/A ISS: LD/O2 - S. K. Robinson O1 - T. W. Virts O3/PLNG - H. D. Getzelman Team 4 PLNG - N/A | | | | | | | | |



LEFT: S116-e-05983 - Curbeam (left) and Fuglesang conduct EVA1 tasks for installation of P5 Truss. New Zealand and Cook Strait are seen in the background.

Continued...

PAYLOAD

WEIGHTS.

PAYLOADS/

EXPERIMENTS

5 CRYO TK SETS

RMS USED FOR RMS/OBSS SURVEYS AND

GRAPPLE/ UNBERTH P5, HANDOFF TO LAUNCH WINDOW:

Total launch window was 10 minutes with window open at 344:01:42:35Z and close at 344:01:52:35Z. Preferred Launch Time was 344:01:47:35Z (In-Plane Time) for a launch window of 5m00s. NOTE: In October, the self-imposed post-Columbia daylight launch constraint was relaxed, thus clearing STS-116 for a night launch.

MISSION HIGHLIGHTS

(LAUNCH SCRUBS/DELAYS,

TAL WEATHER, ASCENT I-LOADS.

FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

LAUNCH DELAYS:

None. Launch occurred on time at 344:01:47:35Z, 8:47:35 PM EST on Saturday, 12/09/06.

TAL WEATHER:

All three TAL sites were forecast and observed GO. MRN was selected as Prime TAL site. MRN had best TD energy, ZZA had low TD energy, and FMI had balloon problems.

PERFORMANCE ENHANCEMENTS:

Include the standard set plus: (1) PE Operational High Q WIN/DEC, (2) OMS Assist, (3) 52 nm MECO, and (4) Del Psi

FLIGHT DURATION CHANGES/LANDING:

- Early planning had STS-116 as an 11+1+2 flight that was changed a few weeks before the flight to 12+0+2 as consumables proved adequate. Pre-flight EOM TIG was 11/17:47 MET with landing at 11/18:49 MET. Difficulties with P5 retraction resulted in an FD8 MMT decision to add an unscheduled EVA 4 to inspect P5 for feasibility of retraction by EVA crew. This resulted in a loss of a weather wave-off day and a 13+1 flight. Undocking would be delayed 1 day and FD10 would be used for a late inspection.

NIGHT LAUNCH #29:

RENDEZVOUS #65: Rendezvous and dock with ISS

FIRSTS/LASTS/NEW:

- First flight of Advanced Health Monitoring System (AHMS). Flew on right engine in monitor mode.
- First use of Quest for four EVA's and four Campout Prebreathes on a Shuttle flight
 First flight with four EVA's by one astronaut - Curbeam
 First on-orbit retraction of an ISS solar array

- First ISS crew rotation through Shuttle since STS-113/11A in November 2002
- First entry of a Shuttle on the day of landing opportunity that was both the first and "pick 'em" days of opportunity for weather

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|-------------------------|-------------------------------|--|-------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |

STS-116/ ISS 12A.1

Continued.



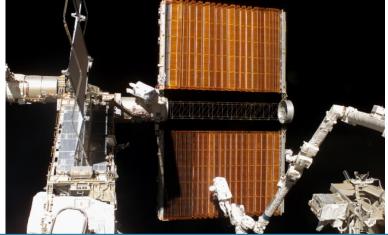
S116-E-05789 - A kink occurred in the port-side P6 solar array during the first attempt to retract that array on Dec. 13, 2006.



JSC2006-E-54706 ---FD Matt Abbott talks to Paul Hill, Mgr Space Shuttle Mission Ops in FCR during the final deployment of some small satellites.



JSC2006-E-53934 (12 Dec. 2006) --- John Shannon, Deputy Shuttle Program Manager and Manager, MMT, emphasizes a point during a MMT meeting in JSC MCC. Behind Shannon are Wayne Hale (left), Shuttle Program Manager; and Robert D. Cabana, JSC Deputy Director.



S116-E-06854 - FD10: EVA 4 Curbeam & Fuglesang (out of frame), working in tandem, used specially-prepared tape insulated tools to guide the P6 overhead SAW neatly inside its blanket box.

Continued..

- OMS Assist ignition at 344:01:49:50Z (duration 1m38s)
 SRMS OBSS/LDRI survey of nosecap, port and starboard wing RCC (WLE's) completed TI maneuver at 345:19:28:22Z (1:17:40:47 MET). Resultant
- altitude 176.7 by 192.4 nm
- R-Bar pitch maneuver started at 345:21:04:46Z and was completed 7m33s later. Photos of Discovery's tile surfaces by
- Docking capture occurred at 345:22:11:05Z (1:20:23:30 MET).
- Hard dock occurred at 345:22:26:33Z (1:20:38:58 MET). ISS hatch open 345:23:54Z (1:22:06 MET), ISS Crew
- Welcomina
- IELK seat liner transfer at 346:01:00:00Z (1:23:12 MET). At that time, Thomas Reiter became a member (MS5) of STS-116 and Sunita Williams joined the ISS Expedition 14 as Flight Engineer
- EVA 1: EV1 and EV2 completed nominal tasks including P5 truss installed to P4 truss and mated P4-P4 umbilicals. 5/8-in socket lost from Pistol Grip Tool. EVA 1 duration 6h36m
- FD5: P6 4B SAW retraction required a series of partial deploy/retract sessions into 19 bays out for P4 SARJ to be free to rotate. P6 4B SAW now 16.5 bays out
- Solar flares raised radiation level. Crew slept in areas with
- better shielding.
 EVA 2: EV1 and EV2 Ch 2/3 reconfig and transfer to permanent power. CETA cart relocate. EVA 2 duration 5h00m
- FD7: Several IVA tests "wiggling" SAW, then
- extension/retraction were unsuccessful, 17.5 bays out EVA 3: EV1 and EV3 Ch 1/4 reconfig and transfer to permanent
- power. T/S P6 SAW. In an attempt to free the wires and grommets, oscillations and retractions were attempted. An additional 6 bays retracted, leaving additional 11 bays out. During EVA, a digital camera floated away. EVA 3 duration
- FD8: ISS and Space Shuttle Programs reached a joint decision to extend STS-116/12A.1 to 13+1 days to perform an unscheduled EVA to troubleshoot and complete P6 SAW
- retraction. Undocking now on FD11 EVA 4: Curbeam and Fuglesang, unscheduled EVA 4 start at 352:19:00:00Z (8:17:12:25 MET). EVA crew successfully retracted P6 the last 36 feet by repeated actions of pulling on guide wires, shaking, and retract commands. Array was successfully retracted and folded into box. EVA duration 6h38m
- Total cargo transferred to ISS from Discovery was 4877 lbs (middeck 1305 lbs and logistics single module 3572 lbs).

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE FNG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |

STS-116/ ISS 12A.1

Continued.



S116e07113 - ISS Configuration, FD11 view from departing Shuttle.







----- IN THE JSC CONTROL CENTER -----

LEFT: JSC2006-E-53281 --- Steve Stich, STS-116 Ascent Flight Director, monitors data and video at his console. CENTER: JSC2006-E-53261 --- Karl A. Silverman with the Space Flight Meteorology Group pores through weather data. RIGHT: JSC2006-E-53290 --- CAPCOM Christopher J. Ferguson follows the latest data (in background Stephen N. Frick). Continued...

EVENTS (Continued):

- Total cargo transferred to Discovery from ISS was 4911 lbs (to middeck 1345 lbs and to logistics module 3566 lbs).

 Total consumables transferred to ISS: Oxygen tank transfer 69 lbm and total nitrogen tank transfer 47.2 lbm; total water transferred to ISS was 261.6 lbm (201.9 lbm in two CWC's and 59.7 lbm in three PWR's).
- Undocked at 353:22:09:35Z
- A flyaround (1/2 lap) was initiated at 353:22:35:13Z.
- Sep 1 and Sep 2 maneuvers resulted in orbit 171.1 by 192.5 nm
- Micrometeoroid Orbital Debris late inspection was completed. MEPSI payload was deployed at 355:00:19:35Z (10:22:32:00
- RAFT payload was deployed at 355:01:56:46Z (11:00:09:11
- ANDE was deployed at 355:18:23Z (11:16:35 MET). No communications blackout during Entry.

SIGNIFICANT ANOMALIES: Orbiter:

- Loss of RMS End Effector Auto Release Capability
- Fuel Cell O2 Flowmeter Failed
- FES Primary B Failed To Come Out Of Standby Port Mid Payload Bay Floodlight Failed A6U Aft Event Thumbwheel Failure

- TPS Tile And Blanket Anomalies
- ML94B Bogen Bracket Shoe Debonded

 Kodak DCS 760 Digital Camera Lost During EVA 3

 Waste Water Dump Degraded Flow

 Z Star Tracker Pressure BITE Fail Indication

 GPS Receiver Failed To Change Satellites

- MADS Signal Dropout
- WLE IDS Sensor Unit Inadvertent Shutdown
- SRB Separation Debris Impact On Orbiter Not A Safety Issue
- T-0 Umbilical 1/4-Inch Frangible Bolt Missing Delaminated/Missing BTA on Aft BSM Housing

RSRM: No IFA's SSME: No IFA's

ET: No IFA's

MOD:

- Erroneous Procedure Callout on OBSS LCS Cue Card MCC Automation System (MAS) File Server Failure ntegration:
- Ice Balls Noted Hanging From The North GOX Vent Arm Duct Exit Flange
- Debris Release from SRB LH BSM Area Traveled Fwd And Impacted Orbiter
- Delaminated/missing BTA on Aft BSM Housing with Sooting

| | | | • | AOL OIL | | | | 10 00 | | MIXI | |
|---|--|--|---|--|---|--|--------|---|------------------|--|---|
| FLT | ORBITER | CREW (6+1 UP/6+1 DN) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | ORBITER | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE FNG. S.N. | AND ET | INC | HA/HP | FOW | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-117/ ISS 13A SEQ FLT# 118 | OV-104 (Flight 28) ATLANTIS OMS PODS: LPO4-28 RPO1-35 | CDR: Frederick W. Sturckow (Fit 3 - STS-88, STS-105) P725/R247/V173/M215 PLT/R2/M1: Lee J. Archambault | KSC 39A 159:23:38:04Z 7:38:04 PM EDT (P) 7:38:04 PM EDT (A) Friday (25) 6/8/07 (11) | EDW 22, CONC EDW 51, CONC 32 173:19:49:37Z 12:49:37 PM PDT Friday (14) 06/22/07 (7) | 104/104/109% PREDICTED: 100/104.5/ 104.5/72 104.5 | BI-129 RSRM 96 ET-124 | (21) | DIRECT INSERTION POST OMS-2: 123.7x84.7 NM DEORBIT: | (5) | CARGO: 42641 LBS PAYLOAD CHARGEABLE: 36593 LBS | BRIEF MISSION SUMMARY: STS-117/13A (21st ISS mission) continued the construction of the International Space Station with the delivery and installation of the second starboard truss segment (S3/S4), the deployment of the third set of solar arrays, and the retraction of the P6 starboard solar array wing, and one radiator. |
| KSC-118 PAD 39A-41 MLP-2 21ST SHUTTLE | FRC4-28 | P726/R307/M265 MS 1/EV 3/R1: Patrick G. Forrester (Fit 2 - STS-105) P727/R269/V186/M235 MS 2/EV4/M2: | LAUNCH WINDOW: 3M 18S (PLT IN- PLANE) EOM PLS: KSC TAL: FMI TAL WX: ZZA (MRN: N/A RWY | DEORBIT BURN: 173:18:43:47Z XRANGE: 772 NM ORBIT DIR: AL 36 AIM PT: NOMINAL | | SLWT 26 ET IMPACT MET 1:14:15 LAT: | | HA 192.8 NM HP 178.8 NM ENTRY VELOCITY: 25868 FPS | | DEPLOYED: 36393 LBS NON-DEPLOYED: 0 LBS MIDDECK: | The truss also contained a Solar Alpha Rotary Joint (SARJ) which rotates 360 degrees for S4 & S6 solar arrays tracking of the sun. In addition, performed unscheduled EVA repair to Port OMS Pod thermal blanket for damage incurred during ascent. |
| FLIGHT TO ISS | ikow i | Steven R. Swanson P728/R308/M266 MS 3/EV2/R1: John D. Olivas P729/R309/M267 | REPAIRS) SELECTED: RTLS: KSC 15 CI/N TAL: FMI 33 N/SFD AOA: KSC 15 N/N TST DAY PLS: EDW 22 N/N | MLGTD: 1443 FT 173:19:49:37Z VEL: 219 KGS 205 KEAS HDOT: -4.0 FPS TD NORM 195: | M 3 EOM: WEIGHT: 199418 LBS X CG: 1084.62 IN | 36.38S LONG: 158.48W | | ENTRY RANGE: 4226 NM | | SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 1317624 LBS | KSC W/D: OPF 125, VAB 8, PAD 17, Rollback to VAB, then VAB 72, PAD 25 = 247 Total Work Days LAUNCH POSTPONEMENTS: - Baselined OV-104 launch date of 09/05/2003 on 07/18/2002 Postponed to 10/02/03 on 10/08/02 due to SSME flowliner crack repairs Postponed to NET 01/22/04 on 03/13/03 due to Columbia |
| FORE SWA | ESTER SSON WAS 17 | MS 4/EV1: James F. Reilly II (Flt 3 - STS-89, STS-104) P730/R234/V172/M204 MS 5 UP/EXP 15/16 FLT ENG: Clayton C. Anderson | TDEL: 0:000(P) 0.112(A) MAX Q NAV: 720.08(P) 719.70(A) | 2380 FT DRAG CHUTE DEPLOY: 196 KEAS 173:19:49:40Z | LANDING: WEIGHT: 199305 LBS X CG: 1086.76 IN | | | | | NON-DEPLOYED: 1585692 LBS CARGO TOTAL: 3743775 LBS | accident Postponed to NET 03/30/04 on 04/17/03 due to Columbia accident Postponed to NET 07/29/04 on 05/28/03 due to Columbia accident Postponed to NET 12/15/04 on 07/29/03 due to Columbia accident |
| | | P731/R310/M268 MS 5 DN/EXP 14/15 FLT ENG: UP ON STS-116, STAY ISS Sunita L. Williams P732/R306/F42 | PERF: NOMINAL 2 ENG TAL (ZZA): | NLGTD: 5379 FT 173:19:49:49Z VEL: 158 KGS 140 KEAS HDOT: -6.2 FPS BRK INIT: 88 KGS | | | | | | PERFORMANCE MARGINS (LBS): FPR: 2651 FUEL BIAS: 1063 FINAL TDDP: 1306 RECON: 1431 | manifest constraints Postponed to NET 02/22/07 on 04/04/06. Slip reflected latest |
| ADDRESS AND | MACON POTOS | SS EVA 102 DOCKED QUEST EVA 25 EMU/TETHERED EVA 95 SCHEDULED EVA 95 DURATION 6:16 | NEG RETURN: 3:47 3:55 PTA (U/S 162): 5:19 5:20 SE TAL (ZZA 104): | DRAG CHUTE JETTISON: 55 KGS 173:19:50:18Z BRK DECEL FPS ² : AVE 4.0 PK 6.0 | | | | | | PAYLOADS: PLB: ISS 13A MIDDECK: ISS 13A RAMBO MAUAI | manifest constraints. - Postponed to NET 03/16/07 on 11/02/06. Slip due to ET delivery/processing schedule. - Launch date "under review" due to ET hail damage during 02/26/07 storm at the PAD. (ET sustained over 4,000 dings.) - Postponed to 06/08/07 on 04/16/07 due to rollback for ET repairs. |
| | | SS EVA 103 DOCKED QUEST EVA 26 EMU/TETHERED EVA 96 SCHEDULED EVA 96 DURATION 7:16 | 6:04 6:08 PTM (U/S 180): 6:19 6:23 SE PRESS 104 | WHEELS STOP: 173:19:50:51Z 11422 FT ROLLOUT: 9979 FT | | | | | | 5 CRYO TK SETS 5 GN2 TANKS RMS 75 ODS, OBSS | LAUNCH SCRUBS: None LAUNCH WINDOW: - Total launch window was 6 minutes 29 seconds with window open at 159:23:34:53Z and close at 159:23:41:22Z. Preferred Launch Time was 159:23:38:04Z (In-Plane Time) for a launch |
| 511 | -117 State | SS EVA 104 DOCKED QUEST EVA 27 EMU/TETHERED EVA 97 UNSCHEDULED EVA 8 DURATION 7:58 | MECO CMD: 8:24.9 8:24.9 | 1:04 M:S | iss015e1170 truss to be a | | | e 17.8 ton S3/ | <mark>/S4</mark> | RMS USED FOR RMS/OBSS SURVEYS AND GRAPPLE/ UNBERTH S3/S4, HANDOFF TO | window of 3m18s. LAUNCH DELAYS: - None. Launch occurred on time at 159:23:38:04Z, 7:38:04 PM EDT on Friday, 06/08/07. |
| | | Continued | Continued | Continued | berthed in th | e Shuttle | payloa | nd bay. | | SSRMS | Continued |

| | | | | , | · · · — · | | | | | / XI X I |
|----------------------------------|---------|---|----------------------------------|--|---|--|------------------------------------|--|--------------------------------------|---------------------------------------|
| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS |
| NO. | ORDITER | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | 1300 | PAYLOADS EXPERIMEN |
| STS-117/ | | Continued | Continued | Continued | LIVO. O.IV. | | | | | |
| STS-117/ ISS 13A Continued | | Continued SS EVA 105 DOCKED QUEST EVA 28 EMU/TETHERED EVA 98 SCHEDULED EVA 97 DURATION 6:29 MCC WHITE FCR (48) FLIGHT DIRECTORS: SHUTTLE: A/E - N. D. Knight LD/01 - C. A. Koerner 02 - B. C. Lunney 03/PLNG - R. S. Jones MOD - P. L. Engelauf Team 4 - M. L. Sarafin ISS: LD/02 - K. B. Beck 01 - A. P. Hasbrook 03/PLNG - H. E. Ridings Team 4 - S. P. Davis CAPCOMS: SHUTTLE: A/E - D. Ā. Antonelli - T. W. Virts (Wx) LD/01 - T. W. Virts 02 - K. A. Ford 03/Plng - R. S. Kimbrough Team 4 - N/A ISS: LD/02 - K. M. McArthur 01 - S. G. Bowen 03/PLNG - R. M. Davis Team 4 - N/A | VI: 25819.0 25818.5 OMS-2: | Continued WINDS: 1.97/0.5R KTS OFFICIAL: 08002P06 KTS 57/3L KTS DENS ALT: 5169 FT FLT DURATION: 13:20:11:33 S/T: 1096:16:06:06 OV-104: 245:12:44:01 DISTANCE: 5,809,363 sm TOTAL SHUTTLE DISTANCE: 444,524,399 sm S117-E-0768 portrait in Do 15, Williams/ Kotov/FE Ex Archambault | B6 (16 June 2 estiny Lab. F/MS/STS-117 pr 15 (Russia) t/STS-117 and orrester, Reill | rom the look from to the series of the serie | left (fi CDR he let 17 CI | ront row): A Yurchikhin ft (middle ro DR Sturckov | nderso (Russi w): PL w. Fro | on/FE Exp a), & T m the left |
| | | | | | | | | YSE | Ser. | |

Continued...

PAYLOADS/

EXPERIMENTS

TAL WEATHER: Launch Day Synopsis: "Showers and thunderstorms will develop during the daylight hours on Friday across Spain and France but are expected to diminish rapidly after sunset. TAL landing times are well after sunset." ZZA and FMI TAL Sites were forecast and observed GO. ZZA was selected as Prime TAL Site. MRN was not available.

MISSION HIGHLIGHTS

(LAUNCH SCRUBS/DELAYS

TAL WEATHER, ASCENT I-LOADS.

FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

PERFORMANCE ENHANCEMENTS

Include the standard set plus: (1) PE Operational High Q SUM/JUN, (2) OMS Assist, (3) 52 nm MECO, Del Psi, and (4) Non-standard Consumables Reduction.

FLIGHT DURATION CHANGES/LANDING:

STS-117 was planned as an 11+2+2 duration flight.

- FD4: The MMT concurred with the recommendation to repair the Port OMS Pod thermal blanket damage incurred during ascent. An additional 2 days, docked to the ISS, and a 4th EVA were added to conduct the repair. FD14: Two KSC landing attempts (12:55 pm & 2:30 pm CDT)
- were waved due to weather. After wave-off, an Orbit Adjust Maneuver was added to the timeline. This 11 FPS burn brought in an additional landing opportunity (total of 3) for Edwards AFB on Friday, FD15.
- FD15: KSC landing attempt at 1:18 pm CDT was waved due to weather. Landing site was switched to Edwards AFB for a successful landing on Orbit Rev 219 at 2:49 pm CDT (12:49 pm PDT). (PAO: "It's a good day to land in California...")

FIRSTS/LASTS:

First flight of 2007.

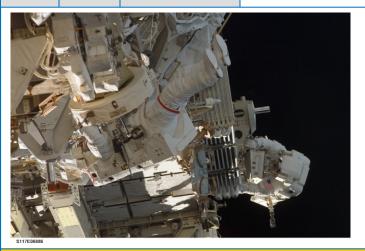
- First Launch from PAD 39A since final flight of Columbia.
- First flight of Advanced Health Monitoring System (AHMS) on all three Sesame's. One flew in Active Mode. Two flew in Monitor Mode. In active mode, AHMS provides safe engine shutdown for excessive turbopump vibrations.
- Sunita Williams sets new female long duration spaceflight record of 195 Days 18 Hours 58 Min, breaking Shinned Lucid's record of 188 Days 4 Hours. Williams surpassed Lucid's record on Saturday, 06/16/07, at 12:47 a.m. CDT First EVA repair of Shuttle thermal blanket.
- Last flight for James Reilly. Reilly flew to two space stations and clocked more than 853 hours in space, with five space walks totaling over 31 hours. He left NASA in June 2008.

RENDEZVOUS #66: Rendezvous and dock with ISS

- EVENTS: OMS 2 ignition at 160:00:16:34Z resulted in a 123.7 by 84.7 nm
- SRMS OBSS/LDRI survey of nosecap, port and starboard wing RCC (WLE's) was completed. At 160:03:50Z, the crew reported damage to a thermal blanket on the Port OMS POD.

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|---|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |

STS-117/ ISS 13A Continued...



S117-E-06886 --- Reilly/EV1(center) Olivas/EV2 (right) connect power, data & cooling cables to S1 & S3, and deploy solar array blanket boxes on S4.



iss015e12948 -- EVA Repair: Anchored to a foot restraint on the RMS robotic arm, astronaut John "Danny" Olivas moves toward port OMS pod thermal blanket damage during EVA 3. Skin stapler and pins were used to make the repair.



S117-E-07789 Forrester/EV3 (left) Swanson/EV4, participate in 4th EVA as construction continues on ISS. Among other tasks, Forrester and Swanson continued activation of the station's new starboard 3 and 4 (S3/S4) truss segments.

Continued...

EVENTS (continued):

- TI maneuver at 161:17:00:57Z: Resultant orbit was 181.2 by 179.4 nm orbit
- Rbar Pitch Maneuver was performed. Photos of Atlantis' tile surfaces and the damaged OMS POD thermal blanket were taken by ISS crew. The thermal blanket damage was later determined to be from ET foam/ice shedding from LO2 line bracket during ascent.
- Docking Capture occurred at 161:19:36:10Z
- Hard Docking occurred at 161:19:47:48Z.
- ISS Hatch open 161:21:20:00Z, 4:20 pm CDT, Sunday, June 10, 2007, ISS crew welcoming
- IELK Seat Liner transfer at 162:00:55Z (7:55 PM CDT, June 10, 2007). At that time, Sunita Williams became a member of STS-120 and Daniel Tani joined the ISS Expedition 16 as Flight Engineer.
- STŠ-117 delivered new set of solar arrays on 21st flight to ISS;
 P6 Starboard array was retracted for over 3 days.
- "Suni" Williams was replaced by Clay Anderson on Expedition 15 and returned home on STS-117 with long duration space record for a female (see Firsts above).
- <u>FD4</u> Station robotic arm used to install S3/S4 truss on S1 truss.
- FD4 EVA 1: Reilly/EV1 & Olivas/EV2 completed the following tasks for S3/S4 Power Generation work: connected 13 power & data umbilicals, unstowed & deployed 1A & 3A solar arrays, and uncinched/unwinched photovoltaic radiator (PVR) for deployment. SARJ work included: installing 4 alpha joint I/F structure (AJIS) struts, installing drive lock assembly (later, EVA 2 determined a problem, see below), removed 6 SARJ locks, and released all swing bolts along SARJ. EVA 1 duration: 6h16m.
- FD4 MMT Management Decisions Summary: On 06/11/07, the MMT concurred: (1) that the Port OMS Pod TPS Blanket is considered (to be] suspect in case of a contingency deorbit, (2) with performing a repair of the OMS Pod Blanket, and (3) with adding 2 extension days and a 4th EVA.
- FD5: Activities completed nominally. Solar Array deployment
 8 bays retracted. Array behavior similar to 4B retraction on
 STS-116 (sticking grommets, asymmetric folding).
- FD6: Russian central and terminal computers failed during docked operations at GMT 164:15:15:00Z and were restored with jumper cables bypassing power monitoring devices.
- with jumper cables bypassing power monitoring devices.

 FD6 EVA 2: Forrester/EV3 & Swanson/EV4 conducted partial retraction of P6 2B Solar Array (including cut leader). Inspected P6 aft radiator starboard PIP pin (only one confirmed). SARJ work included: Installed 4 SARJ brace beams, installed DLA 1 (discovered DLA's were cross wired on the ground), removed 10 SARJ launch locks, and broke torque on 3 SARJ launch restraints. EVA 2 duration: 7h16m.

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|-------------------------|-------------------------------|---|--------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE FNG.S.N | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |

STS-117/ ISS 13A Continued...



s117e08006ISS-earth.jpg: Back-dropped by the blackness of space and Earth's horizon, the new ISS configuration is viewed from the departing Atlantis.







---- IN THE JSC MISSION CONTROL CENTER ----

LEFT: JSC2007-E-31063 -- Orbit 1 FCT: FD/Cathy Koerner (left) & CAPCOM Terry W. Virts Jr. hold STS-117 logo. CENTER: JSC2007-E-28303 --- A "fish-eye" perspective of MOCR activity: (It to rt) CAPCOMs Terry Virts & Tony Antonelli; & FDs Norm Knight & Steve Stich.

RIGHT: JSC2007-E-29876 --- Orbit 2 FCT. FD/Bryan Lunney (wearing business suit) is in foreground.

Continued..

EVENTS (Continued):

- FD8 EVA 3: Conducted by Reilly/EV1 & Olivas/EV2: Removed Lab H2O Vent & installed Lab H2 Vent, repaired OMS POD thermal blanket with skin stapler and pins, relocated 1 of 3 APFR's for 13A.1, and finished retraction of P6 2B Solar Array. This was unscheduled EVA added by MMT. EVA 3 duration: 7h58 m
- FD10 EVA 4: Conducted by Forrester/EV3 & Swanson/EV4: Activated SARJ for rotation, cleared S3 Mobile Transporter path, relocated 2 of 3 APFR's for 13A.1, released torque on S4 MMOD Shield bolts, moved VSSA to Camera Port 1, cleared Node 1 Port for 10A Node 2 temporary stowage, and opened Lab H2 Vent. EVA duration: 6h 29m.
- Transfers:
- Mid-deck resupply cargo transfer to ISS from Atlantis was 1277 lbs.
- Mid-deck return cargo transfer to Atlantis from ISS was 1528 lbs.
- Supply Water total to ISS was 751 L (1,656 lbm)
- Oxygen (net) to ISS was 89 lbm
- Nitrogen to ISS: to A/L tanks 17.3 lbm; into stack for repress 16 lbm
- Lithium Hydroxide (LiOH): STS [used] to ISS = 3, ISS (new) to STS = 3
- Undocked at 170:14:42:00Z followed by a fly-around (1/2 lap).
- Sep 1 & Sep 2 maneuvers resulted in orbit of 185.0 x 177.1 nm
- Micrometeoroid Orbital Debris late inspection was completed.
- No communications blackout during Entry.

SIGNIFICANT ANOMALIES:

Orbiter:

- MDM OA2 CARD 5 Failed Invalid Data
- MADS Recorder Tape Speed Went To 120 IPS (Nom is 15) at Nose Wheel TD
- E3 LH_2 Inlet Pressure Transducer Went OSH at T+ 3.5 Min SRB: None.

RSRM:

- Gas Penetration Through Nozzle Joint 2 RTV, RSRM-96A&B SSME: None.

-T-

- Post-Launch Camera & Film Rev. Loss of LH2 Acreage Foam at Stations 1160, 1623 & 1871
- GDR Data Dropouts During Ascent
- Ascent LOC Push Button Inoperative
- LCC Activation Turning Off WLES PGSC Integration:

Tile Piece Liberated From Aft Fuselage Body Flap I/F During Ascent

- FOD Found In Aft Compartment
- Port OMS Pod Blanket Damage During Ascent
- Rope-Like Material Noted Moving In Umbilical Well Imagery
- Propellant Use During FDS Extended Shuttle Attitude Hold Approx 3 Times Higher Than Predicted

| | | | OI. | ACL SIN | | ······ | | 110 00 | | | |
|--------------------------------|--|--|--|---|---|--|-------------------|--|--------------|--|--|
| E1 T | ODDITED | CREW (7) | LAUNCH SITE, | LANDING SITE/ RUNWAY, | SSME-TL NOM-ABORT | SRB | | ORBIT | FOW | PAYLOAD | MISSION HIGHLIGHTS |
| FLT NO. | ORBITER | ` ' | LIFTOFF TIME, | CROSSRANGE LANDING TIMES | EMERG THROTTLE | RSRM AND | INC | HA/HP | FSW | WEIGHTS, PAYLOADS/ | (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, |
| IVO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | FLT DURATION, WINDS | PROFILE ENG. S.N. | ET | IIVC | па/пР | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-118/ SS 13A.1 | OV-105 (Flight 20) ENDEAVOUR | CDR: Scott J. Kelly (Flt 2 - STS-103) P733/R253/V187/M220 | KSC 39A 220:22:36:42Z 6:36:42 PM EDT (P) 6:36:42 PM EDT (A) | KSC 15 (KSC 65) 233:16:32:17Z 12:32:17 PM EDT Tuesday (21) 08/21/07 (8) | 104/104/109% PREDICTED: 100/104.5/ 104.5/72/ | BI-130 RSRM 97 | 51.6 (22) | DIRECT INSERTION <u>POST OMS-2</u> : 172.2X124.2 NM | OI-30 (6) | CARGO: 37390 LBS PAYLOAD | BRIEF MISSION SUMMARY: STS-118/13A (22nd ISS mission) continued the assembly and resupply of the International Space Station and fulfilled a long-standing teacher's legacy. The new assembly included the delivery of the S5 Truss |
| LT# 119 SC-119 AD 39A-42 | OMS PODS: LPO3-31 RPO4-27 FRC5-20 | PLT: Charles O. Hobaugh (Flt 2 - STS-104) P734/R268/V188/M234 | Wednesday (14) 8/8/07 (8) LAUNCH WINDOW: 4M 14S (PLT IN-PLANE) | DEORBIT BURN: 233:15:25:12Z XRANGE: 697 NM | 104.5 <u>ACTUAL</u> : 100/104.5/ | ET-117 SLWT 27 | | DEORBIT: HA 187.2 NM HP 22.8 NM | | CHARGEABLE: 23899 LBS DEPLOYED: 11830 LBS | segment, installation of a spare parts platform, and changeout of a failed gyroscope. This was the last shuttle resupply mission using the SPACEHAB module. In addition, Barbara R. Morgan, who had served as backup to Christa McAuliffe in the Teacher in Space Project 21 years |
| MLP-1 2ND | | MS 1/R: Tracy E. Caldwell P735/R311/F43 | EOM PLS: KSC TAL: ZZA TAL WX: MRN, FMI | ORBIT DIR: A/L 37 AIM PT: NOMINAL | 104.5/74/ 104.5 1 = 2047 (10) 2 = 2051 (6) 3 = 2045 (9) | MET 1:14:03 | | ENTRY VELOCITY: | | NON-DEPLOYED: 11740 LBS MIDDECK: | earlier, flew as the first Educator Mission Specialist. McAuliffe was a member of the crew that lost their lives in the 1986 Challenger accident. |
| SHUTTLE FLIGHT TO SS | | MS 2/EV1: Richard A. Mastracchio (Fit 2 - STS-106) P736/R257/V189/M224 | SELECTED: RTLS: KSC 15 TAL: ZZA 30L | MLGTD: 1628 FT 233:16:32:17Z VEL: 210 KGS 212 KEAS HDOT: -3.1 FPS | M 3 EOM: | <u>LAT</u> : 36.9S <u>LONG</u> : 159.2W | | ENTRY RANGE: | | 329 LBS SHUTTLE ACCUMULATED | KSC W/D: OPF 1332+64+63+18 = 1477, VAB 9, PAD 25 = 1511 Total Work Days (OPF Processing occurred over a total time period of 1665 days.) LAUNCH POSTPONEMENTS: - Added STS-118 to FDRD - launch date of 10/09/03 on 08/01/02. |
| KELLY H | KOBAUGH | MS 4: | TEM: NO-GO) AOA: KSC 15 TST DAY PLS: EDW 22 TDEL: | TD NORM 205: 2302 FT DRAG CHUTE | WEIGHT: 221740 LBS X CG: 1078.1 IN | 137.244 | | IVIVI CPCP | | WEIGHTS: DEPLOYED: 1329454 LBS NON-DEPLOYED: | Postponed to NET 11/13/03 on 10/08/02 due to engine flowliner crack repairs. Postponed to NET 05/06/04 on 03/13/03 due to Columbia accident. Postponed to NET 06/01/04 on 04/17/03 due to Columbia |
| MONCHAN | | Barbara R. Morgan P738/R313/F44 MS 5: B. Ālvin Drew P739/R314/M270 | 0:000(P) 0.312(A) MAX Q NAV: 707.47(P) 699.34(A) | DEPLOY: 163 KEAS 233:16:32:30Z | LANDING: WEIGHT: 221660 LBS X CG: 1079.8 IN | | | | | 1597761 LBS <u>CARGO TOTAL</u> : 3781165 LBS | accident Deleted flight from FDRD on 05/28/03 Re-baselined to NET 09/14/06 on 07/14/05 Revised to "TBD" on 11/10/05. Slip reflected latest manifest constraints. |
| laks I i | | SS EVA 106 DOCKED QUEST EVA 29 EMU/TETHERD EVA 99 SCHEDULED EVA 98 DURATION 6:17 | SRB STG: 2:02.56(P) 2:03.04(A) PERF: NOMINAL 2 ENG TAL (MRN*): | 233:16:32:29Z VEL: 169 KGS 165 KEAS HDOT: -6.3 FPS BRK INIT: 123 KGS | | | | | | PERFORMANCE MARGINS (LBS): FPR: 2651 FUEL BIAS: 1063 FINAL TDDP: 1913 RECON: 2435 | Postponed to NET 06/11/07 on 04/04/06. Slip reflected latest manifest constraints. Postponed to NET 06/28/07 on 11/02/06. Slip due to ET delivery/processing schedule. Postponed to NET 08/09/07 on 04/16/07. Slip due to STS-117 rollback. |
| APPRICASE WE | NI NI | SS EVA 107 DOCKED QUEST EVA 30 EMU/TETHERED EVA 100 SCHEDULED EVA 99 | 2:34 (P) 2:40(A) *ZZA prime TAL site; Call made off MRN (GO site) NEG RETURN: | DRAG CHUTE <u>JETTISON</u> : 54 KGS 233:16:32:59Z | | , 4 <u>4</u> | * | 1 2 2 3 | | PAYLOADS: PLB: ISS 13A.1-ITS S5 SPACEHAB SM, ESP-3 | Advanced to 08/07/07 on 06/28/07. Provide an adequate number of launch opportunities before a range conflict. Launch delayed to 08/08/07 on 08/03/07 due to "cabin leak checks and other processing work." LAUNCH SCRUBS: None |
| | | DOCKED QUEST EVA 31 EMU/TETHERED EVA 101 SCHEDULED EVA 100 | 3:53 3:56 PTA (U/S 167 FPS): 5:04 5:10 SE TAL (ZZA 104): 5:58 6:08 | BRK DECEL FPS ² : AVE 6.1 PK 9.1 WHEELS STOP: 233:16:33:16Z 11862 FT | | | | | | MIDDECK: ISS 13A.1 RAMBO MAUI | LAUNCH WINDOW: - Total faunch window was 8 minutes 11 seconds with window open at 220:22:32:45Z and close at 220:22:40:56Z. Preferred Launch Time was 220:22:36:42Z (In-Plane Time) for a launch window of 4m14s. |
| | | DOCKED QUEST EVA 32 EMU/TETHERED EVA 102 SCHEDULED EVA 101 | PTM (U/S 179 FPS): 6:16 6:23 SE PRESS 104 | ROLLOUT: 10234 FT 46 SEC | 150039671711 | | 1 | | | 5 CRYO TK SETS RMS 76 ODS, OBSS | LAUNCH DELAYS: - None. Launch occurred on time at 220:22:36:42Z, 6:36:42 PM EDT on Wednesday, 08/08/07. TAL WEATHER: Forecast: Pressure gradient between a surface high over norther |
| | Continued Scribble LVA 101 6:56 6:58 MECO CMD: 8:25.0 8:25.4 Continued | | | | S5 stbd trus | s segmen 3 module (i | t, carg in cen | ter of bay), ar | | RMS USED FOR RMS/OBSS SURVEYS AND GRAPPLE/ UNBERTH S5, HANDOFF TO SSRMS | Spain and low over northern Italy will keep NW winds at FMI and ZZA Wednesday through Friday. Peak winds at FMI are forecast to be above headwind limits all 3 days, but remain within limits at ZZA. MRN weather is forecast "GO" all 3 days. Continued |

| FLT NO. | ORBITER | CREW (7) TITLE, NAMES & EVA'S | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS | SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG, S.N. | SRB RSRM AND ET | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
|------------------------------------|---------|--|---|---|--|---|--------------------------------------|--|--|--|---|
| STS-118/ ISS 13A.1 Continued | | FLIGHT DIRECTORS: | Continued VI: 25819.0 25817.4 OMS-2: 37:00 37:00.7 253.9 FPS252.6 FPS | Continued WINDS: 6H 4L KTS OFFICIAL: 11909P13 KTS 10H 8L KTS DENS ALT: 1973 FT FLT DURATION: 12:17:55:35 S/T: 1109:10:01:41 OV-105: 219:08:07:41 DISTANCE: 5,274,977 sm TOTAL SHUTTLE DISTANCE: 449,799,376 sm | ISS015-E-23 Lab: Front ro CDR Exp15 (RSA). STS- Morgan/MS, | ow, from I Fyodor Y -118 crew Williams | eft: C urchik : mido /MS (0 | & STS-118 collayton C. Ancochin (RSA), & CDR astracchio/MS | derson Oleg I left: Dr Kelly. | n ISS Destiny /FE Exp15, Kotov/FE ew/MS, Back row, | Continued PERFORMANCE ENHANCEMENTS: Include the standard set plus: 1) PE Operational High Q WIN/DEC, 2) OMS Assist, 3) a 52 nm MECO, and 4) Del Psi FLIGHT DURATION CHANGES/LANDING: On 8/12/07, FD5, the MMT concurred with extending the Mission to 14+2 days and adding EVA 4. FIRSTS/LASTS: - First flight of Endeavour in 5 years - First flight test of new system to monitor ECO circuit voltage to fuel sensors. System allows Flight Controllers to recommend manual engine shutdown by the crew if sensor voltage has failed First flight of Automated Meteorological Profiling System (AMPS) High Resolution (HR) as primary system for DOLILU wind measurements - replacement for Jimspheres First flight that Station Shuttle Power Transfer System (SSPTS) available to provide extended duration capability to shuttle - First flight that three-string Global Positioning System (GPS) was used to replace landing TACAN System - previously flown single string only First flight of SRB Command Receiver/Decoder (IRD) and Range Safety Distributor (RSD) due to obsolescence concerns - Last flight of SPACEHAB resupply module First and last flight of Educator Mission Specialist Barbara R. Morgan. She left NASA and returned to Boise State University in 2008. NIGHT LAUNCH - N/A RENDEZVOUS #67: Rendezvous and dock with ISS NINTH SHUTTLE CREWMEMBER REPLACEMENT - Clay Anderson was replaced by Drew in August 2007. (8th Shuttle crewmember replacement occurred on STS-121.) EVENTS: - OMS 2 ignition at 220:22:47:15Z resulted in a 172.2 by 124.7 nm orbit SRMS OBSS/LDRI survey of nosecap and port and starboard wing RCC (WLE's) was completed TI maneuver at 222:15:15:192 - resultant orbit was 186.5 by 180.4 nm - During R-Bar Pitch Maneuver, a gouge in the heat shield below the right wing (site 3) was identified Docking confact occurred at 222:18:01:54Z Hard Dock occurred at 222:18:29:44Z. |

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |

STS-118/ ISS 13A.1 Continued...



S118e06114 - Barbara R. Morgan flew as first **Educator Mission Specialist**



S118-E-06998 - Anchored to the foot restraint on the Canadarm2, Williams, and Mastracchio (out of frame), R&R a faulty control moment gyroscope (CMG-3) into the Z1 truss during EVA 2.

Continued...

EVENTS (Continued)

- ISS Hatch open 222:20:04:00Z, 3:04 pm CDT, Friday, August
- 10, 2007, ISS crew welcoming
 -FD4: MMT, per Flight Rule 13A.1_A2-6 concurred that TPS was considered to be damaged.
 -FD4, EVA 1: EV1 and EV2 installed S5 on S4, relocated S5 PVRGF to S5 Keel (ground strap bolt would not seat again, like P5), retracted and cinched P6 Forward PVR, and retrieved EVA stablet from STDP 21 teelbey. EVA 1 duration 64.15
- Ps), retracted and cinched P6 Forward PVR, and retrieved EVA ratchet from STBD Z1 toolbox. EVA 1 duration 6h17m. FD5: MMT concurred that TPS was considered to be damaged and authorized focused TPS inspection. Mission was extended to 14+2 and EVA4 (preplanned) was added.

 FD6, EVA 2: EV1 and EV2 completed R&R of faulty CMG 3 into ISS Z1 truss, installed old CMG3/FSE/FRAM on nadir ESP-2.
- ISS Z1 truss, installed old CMG3/FSE/FRAM on nadir ESP-2 FRAM Site #5 with MLI cover (no straps), and retrieved EVA ratchet from PORT Z1 toolbox. The failed CMG will remain at its temporary stowage location until it is returned to Earth on a later shuttle mission. The new gyroscope is one of four CMG's used to control Station attitude on orbit. EVA 2 duration 6h28m. FDB, EVA 3: EV1 and EV3 (Exp 15/16) relocated P6 SASA to P1 zenith, installed P1 S-band BSP and Xpdr, moved CETA cart 1 to STBD of MT (connected to MT), moved CETA cart 2 to STBD of MT (connected to CETA 1), and removed P6 S-band Xpdr (dummy box plate installed). EV1 EVA terminated early to EMU glove damage at EVA Phase Elapsed Time (PET) 4:20. The damage did not cause leakage: the suit pressure was unaffected. Due to the early termination, the S-band Antenna Structural Assembly (SASA) Spare Gimbal Locks and Materials International Space Station Experiment (MISSE) 3 and 4 tasks were not completed. EVA 3 duration 5h28m.
 FD8: EVA 4 delayed from FD9 to FD11 by MMT for potential tile repair.

- repair.
 FD9: MMT decided that the TPS repair issue required a Programmatic assumption of risk and that the MMT was willing to assume that risk. The preponderance of data (including ground analysis and arc jet testing) indicated acceptable margins to fly as is. MMT decided that no TPS repair would be performed on Endeavour and that the nominal planned EVA 4 would be executed on FD11.
- Would be executed of 1717.

 FD11, EVA 4: EV2 and EV3 (EXP 15/16) installed OBSS OSE
 (2) on S1 zenith trunnions, re-torqued Z1 SASA gimbal bolts, removed MISSE 3 and MISSE 4 from A/L and returned on removed MISSE 3 and MISSE 4 from A/L and returned on Shuttle, Lab EWIS antenna handrails and cable installed (Lab fwd endcone nadir - got 3 of 3 DZU's installed), and retrieved tools from A/L toolboxes. Did not perform Lab or Node MMOD shield cleanup or S3 WETA installation. EVA 4 duration 5h 2m. FD12: MOD contingency plans for Hurricane Dean Preparedness included decreasing the flight control support to two teams and evacuation on military aircraft if required. The
- plan was not required to be implemented.

| FL | т | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|----|----|---------|--------------|-------------------------------|--|-------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO |). | | TITLE, NAMES | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, | THROTTLE PROFILE | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | | & EVA'S | | WINDS | FNG S N | | | | | | |

STS-118/ ISS 13A.1 Continued...

RIGHT: S118-E-07918 - Category 4 Hurricane Dean, viewed from Endeavour, was moving westerly in the Caribbean nearing Jamaica with sustained winds of 150 mph. MOD contingency evacuation plans were prepared, but not needed.



the in-space ops. 41693 --- In MCC FD launch preps at KSC. BOTTOM: JSC2007-E-42074 --- In MCC Shannon Walker ISS CAPCOM, ISS Lead FD Joel Montalbano (right), & Steven W. Lindsey (standing), Chief of Astronaut







JSC2007-E-46429 (17 Sept. 2007) --- The STS-118 Ascent/Entry flight control team and crewmembers pose for a group portrait in the space shuttle flight control. Flight director Steve Stich holds mission logo with CDR Kelly (left), & CAPCOM Chris Ferguson (right). Additional crewmembers pictured are PLT Hobaugh, Morgan/MS, Caldwell/MS, & Mastracchio/MS.

Continued...

EVENTS (Continued):

Transfers:

- Hartstets:
 Hardware transferred to ISS (outside and inside): 14,740 lbs
 Hardware/supplies returned from ISS: 3,297 lbs
 Water delivered to ISS: 918.6 lbm
 Oxygen to ISS: 77 lbm
 Nitrogen to ISS: 33.8 lbs
 Lithium Hydroxide (LiOH) cans from ISS to STS: 12 cans (9 old 3 used) old, 3 used)
- LiOH new cans from STS to ISS: 30 cans
 Power transferred from ISS to orbiter using the SSPTS was
- Undocked at 170:14:42:00Z followed by a flyaround (1/2 lap) Sep 1 and Sep 2 maneuvers resulted in orbit 185.2 by 183.5
- Micrometeoroid Orbital Debris late inspection was completed. No issues.
- No communications blackout during Entry.

<u>SIGNIFICANT ANOMALIES</u>: Orbiter:

- A Magenta Hue Appeared On Camera (GFE). STS-118 Drag Chute Reefing Line Cutter Failure to Cut (GFE). SRB:
- None. RSRM:
- Gas Penetrations through Nozzle Joint 2 RTV, RSRM-97A&B
- 3 Com Card/Cable Failed (GFE).
- 2007 ET-117 Film Review Found TPS Loss at Sta. 1623 Outboard LO₂
- Feedline Support Bracket and TPS Orb Impact
- XT 1973 Inboard LO₂ Feedline Bracket Base Fitting TPS Crack
- Post-Launch Camera and Film Review Showed Loss of LH₂ Acreage Foam MOD:
- B30M Power Failure B-C Power Feeds
- Margi Output Error

- SRMS Movement Prior To Shuttle Ku Mask
 OBSS Sensor Mode Change From 6 to 2 per MCC
 Procedure Error on PGSC Setup
- Integration:
- Partial Tyvek Cover Release
- SSRMS Movement Prior to Shuttle Ku Mask
- BFS Loss of Class III Alert from Spacehab E

| | | | SF. | ACE SH | 143 30 | IAIIA | IAINI | 1 age 2 102 010 120/10/1 | | | |
|------------|----------------------|--|--------------------------------------|---------------------------------|-------------------------|--|--------|---------------------------------------|-------|----------------------------------|--|
| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
| | | (6+1 UP/6+1 DN) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (5 * * 5 * * 5 * * 5 * * 5 * * 5 | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, WINDS | PROFILE ENG. S.N. | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-120/ | OV-103 | CDR: | KSC 39A | KSC 33 (KSC 66) | 104/104/109% | BI-131 | E1 4 | DIRECT | OL 22 | CARGO: | BRIEF MISSION SUMMARY: STS-120/10A (23 rd ISS mission) |
| ISS 10A | (Flight 34) | Pamela A. Melroy | 296:15:38:197 | 311:18:01:17Z | 104/104/10976 | DI-131 | (23) | INSERTION | (1) | 40872 LBS | provided for expansion of the ISS with delivery of the |
| 100 10/1 | DISCOVERY | (Flt 3 - STS-92, STS-112) | 11:38:19 PM EDT (P) | 01:01:17 PM EST | PREDICTED: | RSRM | (/ | | | | Italian-built U.S. multi-port Node 2 connecting module named Harmony. Installation of Harmony allows for |
| SEQ | 0110 0000 | P740/R261/V175/F34 | 11:38:19 PM EDT (A) Tuesday (16) | Wednesday (15) | 100/104.5/ 104.5/72/ | 98 | | <u>POST OMS-2</u> : 169.9X123.8 NM | | PAYLOAD | named Harmony. Installation of Harmony allows for |
| FLT# 120 | OMS PODS: LPO1-37 | PLT: | 10/23/07 (12) | 11/0//0/ (12) | 104.5/72/ | ET-120 | | 107.7A 123.0 IVIVI | | CHARGEABLE: | attachment of research labs from the European Space Agency (Columbus) and the Japan Aerospace Exploration |
| KSC-120 | RPO3-35 | George Zamka | ` ′ | DEORBIT BURN: | | | | | | 33013 LD3 | Agency (Kibo) to be delivered on subsequent flights. The |
| 1.00 120 | FRC3-34 | P741/R315/M271 | <u>LAUNCH WINDOW</u> : 7M 17S | 311:16:58:49Z | ACTUAL: 100/104.5/ | SLWT 28 | | | | DEPLOYED: | P6 truss segment and solar arrays were replaced from a |
| PAD 39A-43 | 1103-34 | MS 1/EV1: | (PLT IN-PLANE) | XRANGE: 196 NM | 104.5/72/ | 20 | | | | 33474 LBS | temporary location (on 71) to a permanent location on P5 |
| MLP-2 | | Scott E. Parazvnski | ` ´ | | 104.5 | | | | | NON-DEPLOYED: | truss. In this new location, the solar arrays were redeployed to maximize needed power generation for inclusion of the future research labs. Also on this mission, |
| IVILF -Z | | (Flt 5 - STS-66, STS-86, | EOM PLS: KSC TAL: MRN | ORBIT DIR: D/R 21 | 1 = 2050 (6) | ET | | | | 280 LBS | inclusion of the future research labs. Also on this mission. |
| 23RD | | STS-95, STS-100) P742/R187/V144/M165 | TAL WX: FMI | AIM PT: CLOSE IN | 2 = 2048 (7) | IMPACT | | | | | a 1-day extension was added to extend FVA 4 for starboard |
| SHUTTLE | | | | | 3 = 2058 (2) | | | DEODDIT | | MIDDECK: 59 LBS | SARJ inspections, but the EVA was later reworked for a |
| FLIGHT TO | | MS 2/R: | SELECTED: | MLGTD: 1247 FT 311:18:01:17Z | M 3 EOM: | MET 1:14:06 | | <u>DEORBIT</u> : HA 188.0 NM | | 24 FB2 | successful repair of P6 4B solar power array damaged during deploy. |
| ISS | | Stephanie D. Wilson (Flt 2 - STS-121) | SELECTED: RTLS: KSC 15 N/N | VEL: 204 KGS | | | | HP 12.1 NM | | SHUTTLE | 5 , 5 |
| | | P743/R298/V190/F39 | TAL: MRN 20 N/N | 220 KEAS | WEIGHT: | <u>LAT</u> : 36.749S | | | | <u>ACCUMU</u> LATED | KSC W/D: OPF 234, VAB 7, PAD 23 = 264 Total Work Days |
| MEL | ROY | MC 3/EV3. | (ZZA: NO-GO) AOA: NOR 35 N/N | HDOT: -5.4 FPS | 203067 LBS | 30.7495 | | ENTRY | | WEIGHTS: DEPLOYED: | (OPF Processing occurred over a total time period of 273 days.) |
| STREET | - CUAR | MS 3/EV2: Douglas H. Wheelock | 1ST DAY PLS: | TD NORM 195: | X CG: | LONG: | | VELOCITY: | | 1362928 LBS | LAUNCH POSTPONEMENTS: |
| ** | | P744/R316/M272 | EDW 04 CI/N | 3249 FT | 1081.0 IN | 158.983W | | 25850 FPS | | | - Added STS-120 to FDRD - launch date of 02/19/04 on 01/23/03. |
| EELOC | 2 | MS 4/R: | TDEL: | DRAG CHUTE | <u>LANDING</u> : | | | <u>ENTRY</u> | | NON-DEPLOYED: | Postponed to NET 09/23/04 on 03/13/03 due to Columbia accident. |
| | | Paolo A. Nespoli (ESA) | 0:000(P) 0.162(A) | DEPLOY: | WEIGHT: | | | RANGE: | | 1598100 LBS | - Deleted flight from FDRD on 05/28/03. |
| STS | -120 | P745/R317/M273` ´ | MAX Q NAV: | 189 KEAS 311:18:01:26Z | 202989 LBS X CG: | | | 4436 NM | | CARGO TOTAL: | - Re-baselined to NET 08/09/07 on 06/01/06. - Postponed to NET 09/07/07 on 11/02/06. Slip due to ET |
| | | MS 5 UP/EXP 16 FLT ENG: | 719.02(P) 701.56(A) | 311.10.01.202 | 1083.0 IN | | | | | 3822037 LBS | delivery/processing schedule |
| | | Daniel M. Tani | | Continued | | | | | | PERFORMANCE | delivery/processing schedule - Advanced to 08/26/07 on 02/08/07 to avoid spacing problem |
| | | (Flt 2 - STS-108) P746/R272/V191/M238 | SRB STG: 2:02.56(P) 2:03.20(A) | 7 | | | | | - W. | MARGINS (LBS): | with Soyuz and ATV Postponed to 10/20/07 on 04/16/07. Slip due to STS-117 |
| | | P746/R272/V191/IVI238 | | | | 10 | | | | FPR: 2651 | rollback. |
| AV. | 420 | MS 5 DN/EXP 15/16 FLT | <u>PERF</u> : NOMINAL | | | | | | | FUEL BIAS: 1063 | - Postponed to 10/23/07 on 08/07/07. Slip to maintain standard |
| | 50 4 | ENG: Clayton C. Anderson | 2 FNG TAL (MRN): | | 1100 | -ante | - | | | FINAL TDDP: 2091 RECON: 1880 | minimum interval between Soyuz undocking (changed for landing opportunities) and orbiter docking to the ISS. |
| | | (UP on STS-117, Stay on | 2 ENG TAL (MRN): 2:37 (P) 2:45(A) | | 4/19/2 | The same of the sa | | | 4 | INECON. 1000 | , , |
| | | ÌSS) | | | 0 0 1 50 | | | | | PAYLOADS: | LAUNCH SCRUBS: None |
| | | P747/R310/M268 | NEG RETURN: 3:51 3:55 | | | 6 | | | | PLB: | LAUNCH WINDOW: |
| | | SS EVA 110 | | | N SOA | 1 | | | | ISS 10A (NODE 2), PDGF, MBSU, | - Total launch window was 11 minutes 19 seconds with window |
| | | DOCKED QUEST EVA 33 | PTA (U/S 167 FPS): 5:16 5:26 | 1 6 March | | | | | | SASA | open at 296:15:34:17Z and close at 296:15:45:36Z. Preferred |
| | MONY | EMU/TETHERED EVA 103 | 5.10 5.20 | -111 | | | V | | 111 | | L'aunch Time was 296:15:38:19Z (In-Plane Time) for a launch window of 7m17s. |
| | | SCHEDULED EVA 102 DURATION 6:14 | SE TAL (ISTRES | | | | | 103 | | MIDDECK: ISS 10A | |
| 120 | 158 | DORATION 0.14 | 104): 6:04 6:12 | | SIV | | | 18 18 1 | | RAMBO | LAUNCH DELAYS: - None. Launch occurred on time at 296:15:38:19Z, 11:38:19 AM |
| SI S | 1 | | 0.01 | | | | | | | MAUI | EDT on Tuesday, 10/23/07. (PAO: "It's a nice day in Florida") |
| | | Continued | PTM (U/S 181 FPS): 6:16 6:27 | | 9 | | - 10 | 37/// | 1 | E CDVO TV CETC | .,, (|
| NOI | DE 2 | | 0:10 6:27 | | 6. | - | NA I | 3 | 2 0 | 5 CRYO TK SETS | Continued |
| | | | Continued | S120-E-006397 (25 | Oct 2007) Lie | torical first s | naco m | poeting of female | | RMS 77 | O'minuou |
| | | | | Women Commande | ers Pegav Whitso | on (right) ISS | FXP | 16 CDR, greets P | am | ODS, OBSS | |
| | | | 1 | Tromen communic | 75. Toggy willist | in (right), 130 | | io obit, greets i | u.ii | | |

Melroy, STS-120 CDR.

| FLT | ORBITER | CREW (6+1 UP/6+1 DN) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|----------|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-120/ | | Continued | Continued | Continued | | | _ | | | | Continued |

ISS 10A Continued...

MCC WHITE FCR (50)

FLIGHT DIRECTORS:

LD/O1 - R. E. LaBrode O2 (FD2-FD13) - M. P.

O2 (FD1, FD14 and Waveoff) - M. R. Abbott O3/PLNG (FD1-FD13) -

M. L. Sarafin PLNG (Prelaunch, FD1,

ENT - B. C. Lunnev

Team 4 - P. F. Dye

MOD - P. L. Engelauf

LD/O2 - J. D. Hassmann O1 - D. J. Weigel

- L. J. Archambault (Wx) LD/O1 - C. J. Ferguson O2 - D. A. Antonelli

O3/PLNG - H. L. Rarick

Team 4 - G. Kerrick

A/E - T. W. Virts

CAPCOMS:

SHUTTLE:

FD14, and Waveoff - A. J.

SHUTTLE: A/E - N. D. Knight

Moses

Ceccacci

SS EVA 111 **DOCKED QUEST EVA 34** EMU/TETHERED EVA 104 SCHEDULED EVA 103 **DURATION 6:33**

DURATION 7:08

SS EVA 113 DOCKED QUEST EVA 36 EMU/TETHERED EVA 106 SCHEDULED EVA 105 **DURATION 7:19**

SS EVA 112 DOCKED QUEST EVA 35 EMU/TETHERED EVA 105 SCHEDULED EVA 104

JSC2007-E-095788 In MCC, FDs, Knight (left) & Lunney, monitor EVA repair of ISS solar panel shown in photos at right &



LD/O2 - K. A. Ford O1 - H. Getzelman O3/PLNG - Z. Jones Team 4 - N/A

O3/Plng - S. W. Lucid Team 4 - N/A

ISS016-E-008875 --- Close-up view of the repaired solar array.

Continued...

SE PRESS 104 7:06 6:57 MECO CMD: 8:25.6 8:25.8

BRK INIT: 109 KGS 25819 25817

DRAG CHUTE JETTISON: 52 KGS OMS-2 37:22 37:19.6 232.8 FPS230.9 FPS 311:18:01:53Z

BRK DECEL FPS²: AVE 6.3 PK 10.5

NLGTD: 5419 FT

HDOT: -5.9 FPS

150 KGS 163 KEAS

311:18:01:30Z

VEL:

WHEELS STOP: 311:18:02:11Z 9593 FT

ROLLOUT: 3346 FT 54 SEC

<u>WINDS</u>: 10.6H 2.8R KTS OFFICIAL: 35013P22 KTS 21H 6R KTS

DENS ALT:

FLT DURATION: 15:02:22:58

S/T: 1124:12:24:39

291:13:57:03

DISTANCE: 6,249,432 sm

TOTAL SHUTTLE DISTANCE: 456,048,808 sm



S120-E-007608 --- STS-120 & Exp16 crews ISS Harmony node. From left (bottom): Anderson/MS (DN), CDR Peggy A. Whitson, Yuri I. Malenchenko/FE/Exp16 (RSA) & PLT Zamka. From left (center): Wilson/MS, CDR Pam Melroy, & Nespoli/MS (ESA). From left (top): Daniel Tani/FE/Exp16 (UP), Parazynski/MS, & Wheelock/MS



ISS016-E-009207 (3 Nov. 2007) --- While anchored to a foot restraint on the end of the OBSS, Parazynski/EV1 assesses his repair work as the solar array is fully deployed during EVA 4.

TAL WEATHER:

The weather model data for Europe continued to show an area of low pressure near Italy, with high pressure over central France. Windy conditions at ZZA and FMI were expected to contribute to pockets of turbulence in the region. Weakening high pressure was forecast over southern Spain, with partly cloudy skies and southwest winds at MRN Tuesday. All three TAL sites were forecast and observed GO. Moron was selected as Prime TAL

PERFORMANCE ENHANCEMENTS

include the standard set plus: 1. PE Operational High Q TRN/OCT, 2. OMS Assist, 3. 52 nautical mile MECO, and 4. Del

FLIGHT DURATION CHANGES/LANDING:

On FD7, MMT concurred with adding a docked extension day to the mission to extend EVA 4 for starboard SARJ inspections for cause of vibrations and drag.

- Historical first meeting of two spacecrafts commanded by women: Peggy Whitson, the first woman to command the ISS, and Pamela A. Melroy, the second woman space shuttle
- Successful first time operation of OV-103 Station-to-Shuttle Power Transfer System (SSPTS)
- First ET LO2 IFR bracket pockets filled with BX (replaces PDL in pockets) to minimize void formation.
- First flight of OI-32 Flight Software. Standard capability release included changes for enhanced crew safety and situational awareness, improved mated control of ISS, and other enhancements for ground and flight operations and safety. First High-definition TV coverage of Launch (by CNN)

NIGHT LAUNCH: (N/A)

RENDEZVOUS #68: Rendezvous and dock with ISS

EVENTS

- OMS 2 ignition at 296:15:48:44Z resulted in a 159.9 by 123.8
- SRMS OBSS/LDRI survey of nosecap and port and starboard wing RCC (WLE's) was completed.
- TI maneuver at 298:09:55:25Z resulted in a 188.7 by 179.7 NM
- R-Bar Pitch Maneuver was performed. No significant issues
- Docking Capture occurred at 298:12:39:57Z.
- Hard Dock occurred at 298:12:52:50Z.

| FLT | ORBITER | CREW (6+1 UP/6+1 DN) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |

STS-120/ ISS 10A Continued.







ABOVE: In JSC MCC, Ed Gonzalez/Ascent Trajectory Officer monitors prelaunch data. CENTER: JSC2007-E-095148 ---In JSC MCC, FD Mike Moses (standing) escorted former President George H.W. Bush and former First Lady Barbara Bush shown talking to Shuttle & ISS crews on-orbit. AT RIGHT: JSC2007-E-097963---- On Nov.8 at Ellington Field. President George W. Bush greets returning CDR Melroy (pictured) and other crew members (out of frame) with JSC Director Mike Coats in the background.



S120-E-008531 (5 Nov. 2007) --- Back-dropped by the blackness of space and Earth's horizon, the new ISS configuration is viewed from the departing STS-120 Discovery.

SIGNIFICANT ANOMALIES:

Orbiter:

- V070-396376-201, Blanket R&R
- Protrusion on the Arrowhead Plate (H-0.38)

- Protruding Ames Gap Filler (H=0.21 & H=0.29)
 Blanket is lifted off left (Port) OMS Pod
 The MPS Engine #1 LO₂ Inlet Temperature failed off scale high at 15:41:15GMT during STS-120 Ascent.
- On STS-120/OV-103, Measurement V62T0519A was erratic, diverged from approximately 184 degrees F

Missina debrís

SRB:

- Nonlinear separation on LH SRB of the Frustrum/Forward Skirt Ordnance Ring for STS-120/BI-131
- STS-120/ET-120 launched on 10/23/07: Post Launch camera and film review showed loss of foam at two locations.
- Gas penetrations through Nozzle Joint 2 RTV, RSRM-98A&B Gas penetration through RTV, Nozzle Joint 5, RSRM-98B SSME: None

ET: None

MOD:

- Missing step in PDRS STBD survey procedure
 Typo IMU align in Orb Ops Checklist
- RMS Joint Angle Ground Display Error
- INTEGRATION:
 LH₂ Umbilical ice noted prelaunch
- GUCP ice bridged to ET Intertank Foam
- ET LH₂ Tank foam acreage losses
 Unexpected debris/expected debris exceeding mass allowable prior to pad clearance (liftoff debris)
- Debris release on outboard side of LO2 Feedline at ~277 sec MET

- ISS Hatch opened at 9:39 AM (CDT) on10/25/07 (298:14:39:00Z) Shuttle Crew welcomed by ISS Crew Historical first meeting of two spacecrafts commanded by
- IELK Seat Liner Transfer at 298:16:12Z (11:12 AM CDT, Oct. 25, 2007). At that time Clayton Anderson became a member of STS-120 and Daniel Tani joined the ISS Expedition 16 as Flight
- FD4 EVA 1: (EV1 and EV2) Removed the failed SASA from Z1; installed SASA in PLB sidewall carrier; prepped Node 2
- installed SASA in PLB sidewall carrier; prepped Node 2 (Harmony) for removal from bay; demated P6/Z1 fluid OD's; used Station robot arm (PDGF) to install Node 2 to temporary location on Node 1 (Unity). [NOTE: Node 2 was moved to its permanent location at the front of the U.S. Lab using the ISS robotic arm after shuttle departure.] EVA1 duration 6h14m FD6 EVA 2: EV1 and EV3 conducted P6 truss demate from temporary location on Z1; EV3 performed inspection of suspected sharp edge on S1 CETA rail; Initial stbd SARJ inspection; Node 2 Outfitting (EV1 completed all of this solo); structurally installed the Node 2 PDGF; successfully deployed the two outboard S1 radiators between EVA 2 and EVA 3 (so all three are now deployed). EVA 2 duration 6h33m FD7: MMT concurred with adding a docked extension day to the mission to extend EVA 4 for starboard SARJ inspections for cause of vibrations and drag.
- the mission to extend EVA 4 for starboard SARJ inspections for cause of vibrations and drag.

 FD8 EVA 3: EV1 and EV2 attached P6 truss to P5 (permanent location). The 2B solar array was 100% deployed. The 4B array was aborted at 25 bays, with a tear in the right blanket (guide wire snag). EVA 3 duration 7h 8m

 FD11: MMT concurred with new plan for EVA4 to repair the Solar Array Wing (SAW) 4B repair. The Tile Ablator Dispenser DT0 was postponed.
- FD12 WAS postponed.
 FD12 EVA 4: (EV1 & EV2) EV1 repaired the P6 4B array using the OBSS on the SSRMS with a WIF-E. As reported by the Rocky Mountain News: "Parazynski...performed what NASA is calling on e of the greatest 'space saves' in the history of manned spaceflight...[He] floated outside with wire cutters, pliers, and homemade tools to fix the torn wing" [restoring maximum power capability to the ISS.] EVA 4 duration 7h 19m

- Hardware transferred ISS (outside and inside): 33,834 lbs
- Hardware/supplies returned from ISS: 2,020 lbs
 Water delivered to ISS: 939.1 lbm

- Note: delivered to 153. 757.1 mm
 Oxygen transferred to 1SS: 30 lbm
 Nitrogen transferred to 1SS: 31.6 lbs
 Power from ISS to Orbiter using SSPTS: 1186 kWh.

 FD14: Undocking from ISS: 309:10:32:03Z (4:32 am CST,
- Sep 1 & Sep 2 maneuvers resulted in orbit 189.6 by 181.9 nm. Micrometeoroid Orbital Debris late inspection was completed.
- Anderson returned home after 152 days in space.
- Communications blackout time during Entry: 1m

| | | CREW | LAUNCH SITE, | LANDING SITE/ RUNWAY, | SSME-TL NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
|--|-----------------------|--|---|--|------------------------------|-------------------------|----------------------|--|--------------|-------------------------------------|---|
| FLT | ORBITER | (6+1 UP/6+1 DN) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES, | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, | THROTTLE PROFILE | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | & EVA'S | ADORT TIMES | WINDS | ENG. S.N. | LI | | | | EXI EKIMENTS | TIKOTO, SIGNII IOANT ANGWALLES, ETC.) |
| | OV-104 (Flight 29) | CDR: Stephen N. Frick | KSC 39A | KSC 15 (KSC 67) 051:14:07:09Z | 104/104/109% | BI-132 | 51.6 | DIRECT INSERTION | OI-32 (2) | <u>CARGO</u> : 40296 LBS | BRIEF MISSION SUMMARY: STS-122/1E (24th ISS mission) |
| | ATLANTIS | (Flt 2 - STS-110) | 038:19:45:30Z 2:45:30 PM EST (P) 2:45:30 PM EST (A) | 9:07 AM EST | PREDICTED: | RSRM | ` ′ | | (2) | | delivered the European Space Agency's Columbus research laboratory module to the ISS. Columbus, |
| SEQ FLT# 121 | OMS PODS: | P748/R276/V192/M242 | Z:45:30 PM EST (A) Tuesday (35) 2/07/08 (9) | Thursday (11) 02/21/08 (7) | 100/104.5/ 104.5/72/ | 99 | | <u>POST OMS-2</u> : 124.0X118.8 NM | | <u>PAYLOAD</u> CHARGEABLE: | measuring 23 ft in length and 15 ft in diameter, is ESA's largest contribution to the expansion of the ISS. Also |
| | LPO4-29 | PLT: Alan G. Poindexter | | DEORBIT BURN: | 104.5 | ET-125 | | | | 32941 LBS | delivered were ESA experiments and two ESA astronauts with one of them to join the ISS crew for operation of |
| | RPO1-36 FRC4-29 | P749/R318/M274 | <u>LAUNCH WINDOW</u> : 5M1S | 051:12:59:52.0Z | ACTUAL: 100/104.5/ | SLWT 29 | | | | <u>DEPLOYED</u> : 30657 LBS | Columbus research. This mission also saw the Columbus |
| PAD 39A-44 | | MS 1/R: Leland D. Melvin | (PLT IN-PLANE) | XRANGE: 408 NM | 104.5/74/ 104.5 | | | | | | Control Center in Oberpfaffenhofen, near Munich, Germany, brought on-line for initial checkout and future operations of |
| MLP-1 | | P750/R319/M275 | <u>EOM PLS</u> : KSC TAL: ZZA | ORBIT DIR: A/L 38 | | ET | | | | NON-DEPLOYED: 2162 LBS | the laboratory. |
| 24TH | | IVIO Z/LVI. | | <u>aim pt</u> : Nominal | 1 = 2059 (2) 2 = 2052 (6) | <u>IMPACT</u> | | | | MIDDECK: | KSC W/D: OPF: 121, VAB HB-3: 7, PAD A: 76 = 204 Total Work Days (+1 holiday @ OPF Processing + 10 holidays + 4 |
| SHUTTLE FLIGHT TO | | Rex J. Walheim (Flt 2 - STS-110) | OF! FOTED | MLGTD: 2344 FT | 3 = 2057 (3) | MET | | | | 122 LBS | contingency days @ PAD) |
| ISS | | P751/R277/V193/M243 | <u>SELECTED</u> : <u>RTLS</u> : KSC 15 N/N | 051:14:07:09Z VEL: 197 KGS | | 1:14:07 | | | | <u>SHUTTLE</u> | LAUNCH POSTPONEMENTS: - Added STS-122 to FDRD - launch date of 10/17/07 on 10/05/06. |
| | | MS 3/EV2: Hans Schlegel (Germany) | TAL: ZZA 30L N/N AOA: NOR 23 N/N | 194 KEAS HDOT: -2.1 FPS | | <u>LAT</u> : 36.619S | | | | ACCUMULATED WEIGHTS: | Postponed to 12/06/07 on 04/16/07 due to STS-117 rollback. |
| | | Hans Schlegel (Germany) (Flt 2 - STS-55) P752/R163/V194/M143 | 1ST DAY PLS: EDW 04 N/N | TD NORM 195: | | LONG: | | DEORBIT: | | DEPLOYED: 1393585 LBS | - After 12/06/07 scrub, see <u>LAUNCH SCRUBS</u> below, launch was reset for 24-hr turnaround on Friday, 12/07/07. |
| 122 45 | 2011 | MC 4/EV/2 | TDFI · | 2200 FT | M 3 EOM: | 158.796W | | HA 187.6 NM HP 23.1 NM | | | - Later, on 12/06/07, during MMT Scrub Turnaround Meeting, it was decided to extend to a 48-hr turnaround for Saturday, 12/08/07 launch to allow additional time to address all concerns. |
| A STATE OF THE STA | | Stanley G. Love | 0:000(P) 0.212(A) | DRAG CHUTE DEPLOY: | WEIGHT: 207295 LBS | | | 20.114101 | | NON-DEPLOYED: 1600348 LBS | 12/08/07 launch to allow additional time to address all concerns. - At Friday, 12/07/07 MMT, it was determined that necessary |
| | | P753/Ŕ320/M276 | MAX Q NAV: | 188 KEAS | X CG: | | | <u>ENTRY</u> VELOCITY: | | CARGO TOTAL: | - At Friday, 12/07/07 MMT, it was determined that necessary discussion could not be finished in time for Saturday 12/08/07 Jaunch attempt. The Jaunch was moved to Sunday 12/09/07 |
| Pall | | MS 5 UP/EXP 16 FLT ENG: Leopold Eyharts (ESA) | 756.21(P) 755.17(A) | | 1078.2 IN | | | 25860 FPS | | 3862333 LBS | discussion could not be finished in time for Saturday 12/08/07 launch attempt. The launch was moved to Sunday 12/09/07 with a new Launch Commit Criteria (for this launch only) requiring four of four valid ECO sensor readings (rather than three of four) prior to launch. In addition, the following two conditions were added: 1) Launch Window was limited to inplane +1 minute (to provide additional ascent fuel margin), and 2) utilization of new in-flight ECO circuit voltage readings (successfully tested on STS-118 and STS-120 by ground flight controllers to reamment manual parties that the ground states are readings. |
| No. | 552 | (also flew on MIR Feb 1998) P754/R321/M277 | SRB STG: 2:04.16(P) 2:04.16(A) | | LANDING: | | | <u>ENTRY</u> | | PERFORMANCE | three of four) prior to launch. In addition, the following two |
| | | MS 5 DN/EXP 16 FLT ENG: | PERF: NOMINAL | VEL: 157 KGS 155 KEAS | WEIGHT: | | | RANGE: 4403 NM | | MARGINS (LBS): FPR: 2651 | plane +1 minute (to provide additional ascent fuel margin), and |
| | | Daniel M. Tani (Flt 2 - STS-108, STS-120 | 2 ENG TAL (MRN): | HDOT: -4.9 FPS | 207215 LBS | | | 1100 14141 | | FUEL BIAS: 1063 FINAL TDDP: 2402 | (successfully tested on STS-118 and STS-120 by ground flight |
| XV | | up) P755/R272/V191/M238 | 2:35(P) 2:38(A) | BRK INIT: 91 KGS | X CG: 1080.4 IN | | | | | RECON: 3435 | if required. |
| | | | <u>NEG RETURN</u> : 3:51 3:54 | DRAG CHUTE JETTISON: | | | | | | PAYLOADS: | - After second scrub on 12/09/07, see <u>LAUNCH SCRUBS</u> below, launch was rescheduled to NET 01/02/08 contingent on |
| | | SS EVA 114 DOCKED QUEST EVA 37 | | 54 KGS 051:14:07:46Z | | | | | | PLB: ISS 1E | development and implementation of fuel ECO sensor system |
| | | EMU/TETHERED EVA 107 SCHEDULED EVA 106 | PTA (U/S 161 FPS): 5:04 5:05 | 031.14.07.402 | 100 | | A. | | | (COLUMBUS MODULE) | - Postponed to 01/10/08 on 12/13/07 dependent on resolution of |
| | | DUDATION 7 FO | SE TAL (ZZA 104): | BRK DECEL FPS ² : AVE 4.6 PK 6.9 | 100 | | | 100 | | ICC-LITE ['] ECSH | many people as possible to have time with family and friends at the time of year when it means the most." Tanking test using |
| | | SS EVA 115 | 0.002 | | 5 | 1 | | Mine | | PDGF | add-on Time Domain Reflectivity (TDR) instrumentation on 12/18/07 isolated ECO Sensor System failures to open circuit in |
| | | EMU/TETHERED EVA 108 | PTM (U/S 167 FPS): 5:58 6:02 | WHEELS STOP: 051:14:08:07Z | | I | | A Mic | | MIDDECK: | the three-part "pass-through connector." IPS removal on the |
| | | SCHEDULED EVA 107 DURATION 6:45 | Continued | 10911 FT | 6 1 1 | | 1/2 | 1 | | ISS 1E MAUI | tank was authorized at the pad to begin moving toward removal of the hardware, if required, to solve the problem. Launch date |
| UMBU | S MODU | | | ROLLOUT: 8567 FT | Marie Control | | 1 | N. III | | 5 CRYO TK SETS | remained unchanged Postponed to <u>TBD</u> on 01/03/08; however, PRCB established a |
| | | Continued | | 58 SEC | | 1 | 1 | | - | | "work to" launch date of 02/02/08 dependent on testing of removed ECO connector, installation of replacement connector, |
| N. A. | Em | | | | | | ÎES | | | RMS 78 | and replacement and retesting procedures of Ascent Thrust Vector Control (ATVC) unit. |
| Iss | 1E | | | Continued | S122-F-00787 | 3 (11 Feb. 20 | 008) | Photographed from | om | ODS OBSS SSPTS | 1.55.6. 5011101 (11.1.5) 4111. |
| | | | | | ISS, the station | n's robotic Ca | anadarn Atlantis' | Photographed from 2 moves the payload bay to the | he | SSPTS | Continued |
| | | | | | starboard side | of the Harmo | ony mod | dule. | | | |
| | | | | I | | | | | | | 1 |

CDACE CHITTIE MICCIONIC CHMMADV

| | | | Page 2-100 - 313-122/1E | | | | | | | | |
|---------------------------------|---------|--|---|--|----------------------------------|-------------|-----|-------|-----|--------------------------|---|
| FLT | ORBITER | CREW (6+1 UP/6+1 DN) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES, & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-122/ ISS 1E Continued | | SS EVA 116 DOCKED QUEST EVA 39 EMU/TETHERED EVA 109 SCHEDULED EVA 108 DURATION 7:25 MCC WHITE FCR (51) | Continued SE PRESS 104 6:55 6:55 MECO CMD: 8:22.9 8:22.8 VI: 25819 25818 | Continued WINDS: 1.9T 0.6R KTS OFFICIAL: 31003P05 KTS 5H 2L KTS DENS ALT: 77 FT | | | | | | | Continued - New "work to" launch date of NET 02/07/08 established on 01/14/08. Testing of removed ECO connector confirmed problem in the connector. - Officially postponed launch to 02/07/08 on 01/28/08. Slip was due to ECO sensor problems experienced during December launch attempt and implementation of ECO sensor connector soldered mod. (Also, LCC went back to the standard three of four valid ECO sensor readings.) |

CAPCOMS: SHUTTLE: A/E - J. P. Dutton - T. W. Virts (Wx) LD/O1 - K. A. Ford O2 - S. K. Robinson PLNG - S. W. Lucid Team 4 - N/A

ISS: 01 - H. Getzelman LD/O2 - C. J. Cassidy O3/PLNG - C. E. Zaiac Team 4 - N/A

FLIGHT DIRECTORS: SHUTTLE: ASC - N. D. Knight LD/O1 - M. L. Sarafin O2 - A. J. Ceccacci PLNG - P. F. Dye

ENT - B. C. Lunney MOD - P. L. Engelauf Team 4 - M. R. Abbott

LD/O2 - S. P. Davis O1 - R. C. Dempsey O3 - J. R. Spencer Team 4 - K. L. Alibaruho IP FD - A. P. Hasbrook (I/F w/Columbus CC. Oberpfaffenhofen, Germany)

FLT DURATION: 12:18:21:39 S/T: 1137:06:46:18 OV-104: 258:07:05:40 159.6 FPS158.1 FPS DISTANCE: 5,296,842 sm

37:40

TOTAL SHUTTLE DISTANCE: 461,345,650 sm

S122-E-008923 (15 Feb. 2008) --- Mission Specialist, Rex Walheim, performs work on the outside of the Columbus laboratory. Mission Specialist, Stanley Love (out of frame), shared this EVA with Walheim



S122-E-009694-- STS-122 & EXP 16 crews in ISS Zvezda SM: STS CDR Frick (bottom left), Walheim/MS (bottom center), Melvin/MS (bottom right), Exp 16 CDR Peggy Whitson, Love/MS (above Whitson), STS PLT Poindexter (top right), Tani/MS (top left), Leopold Eyharts EXP FE (ESA) (left middle), Schlegel/MS (Germany), Yuri I. Malenchenko/EXP FE (RSA) is above Walheim.

Thursday, 12/06/07 launch attempt was terminated 2 hours into tanking when two of four engine cutoff (ECO) low-level LH2 fuel sensors failed wel/dry test. (The 5% sensor also failed wet during drain-back.) The ECO sensors are required for backup engine shutdown command to avoid catastrophic failure in the event of early fuel depletion. Launch was scrubbed at 8:56 am CST. Technical Scrub.

Sunday, 12/09/07 launch attempt was terminated when one of previously failed sensors failed again during tanking, a couple of minutes into fast-fill. Engineers stated that the ET feedthrough and connector assembly was the most likely source of the problems. The 12/06/07 and 12/09/07 launch attempts produced previously unavailable time trending data that showed sensor faults occurring shortly before and after the feedthrough and connector were immersed in the super-cold propellants. Technical Scrub.

AUNCH WINDOW

Total launch window was 10m1s with window open at 038:19:40:29Z and close at 038:19:50:30Z. Preferred Launch Time was 038:19:45:30Z (In-Plane Time) for a launch window of

None. Launch occurred on time at 038:19:45:30Z, 1:45:30 PM CST on Thursday 02/07/08.

TAL WEATHER

Weather for the Transoceanic Abort Landing (TAL) sites during launch was benign. High pressure at the surface and aloft produced clear skies and light winds for Moron, Spain (MRN), Zaragoza, Spain (ZZA), and Istres, France (ISTRES). All three TAL sites were forecast GO throughout the launch count.

S122-E-008911--- Schlegel/MS (ESA Germany) continues work aimed toward readving the new Columbia lab for dutv

| FLT | ORBITER | CREW (6+1 UP/6+1 DN) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|-------------------------|-------------------------------|--|-------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES, | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, | THROTTLE PROFILE | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | & EVA'S | ADOINT TIMES | WINDS | FNG S N | LI | | | | LAI LIMIVILINIS | TIKSTS, SIGNII ICANT ANOMALIES, ETC.) |

STS-122/ ISS 1E Continued.



S122E011027



JSC2008-E-010344 --- FD's Norm Knight (left), Bryan Lunney, & Richard Jones monitor data in the Space Shuttle FCR of JSC's MCC during launch countdown activities a few hundred miles away at KSC.



JSC2008-E-010460 (8 Feb. 2008) --- John Shannon (right), Deputy Shuttle Program Manager; and Mike Sarafin, Lead Shuttle Flight Director, participate in an STS-122 press briefing with news media representatives at JSC. Rob Navias, PAO, (left) serves as moderator for the briefing.

Continued...

PERFORMANCE ENHANCEMENTS: Include the standard set plus: 1) PE Operational High Q WIN/FEB, 2) OMS Assist, 3) a 52 nm MECO, and 4) Del Psi.

FLIGHT DURATION CHANGES/LANDING: On FD4, MMT concurred with formally changing mission duration from 11+1+2 to 12+0+2 to honor ISSP request for extra docked day for commissioning Columbus. (Activity did not fit 11-day miśsion.)

On FD7, MMT concurred with extending the mission duration to 13+0+2 to provide additional time needed to complete the activation of the Columbus module. Landing day was moved to 02/20/08.

FIRSTS/LASTS

- First flight ECO sensor connector soldered mod First flight of new RSRM Nozzle-to-Case J-leg Joint insulation configuration
- New Annex Flight Rule in place to outline operational use of ECO sensor voltage measurements Addition of the Modified Adjustable Protective Mitten Assemblies

- Addition of the Modified Adjustable Protective Mitter Assemblies (APMA's) or Overgloves

 First operational support from the Columbus Control Center in Oberpfaffenhofen, Germany

 First reboost of ISS since December 2002

 Last Shuttle Mission for Shuttle Program Manager N. Wayne Hale, Jr., a 30-year veteran of NASA who helped lead the space agency's recovery from the 2002 Columbia Disaster. agency's recovery from the 2003 Columbia Disaster.

MEMEN 103.

Mementos carried aboard STS-122 included three green starter flags celebrating the 50th anniversary of NASA and the 50th running of the Daytona 500 NASCAR Race, a dried red rose to be woven into a NASA-themed 50th anniversary float for the Tournament of Roses Parade, and 20 ESA flags whose use will be to commemorate the addition of Columbus to the ISS.

NIGHT LAUNCH: N/A

RENDEZVOUS #69: Rendezvous and dock with ISS

- OMS 2 ignition at 038:20:23:09.9Z resulted in a 124.4 by 118.7
- SRMS OBSS/LDRI survey of nosecap and port and starboard wing RCC (WLE's) was completed.
- TI maneuver at 040:14:37:28Z resulted in a 184.0 by 176.0 nm
- B-Bar Pitch Maneuver was performed. No significant issues Docking Capture occurred at 040:17:17:20Z.
- Hard Dock occurred at 040:17:30:22Z (above the South Australian coast - Columbus reached its permanent home).
- ISS Hatch Open 12:40 PM CST, Saturday, 02/09/08 welcomed by ISS Crew.

| FLT | ORBITER | CREW (6+1 UP/6+1 DN) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|--------------------------|-------------------------------|--|-------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES, & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, | THROTTLE PROFILE | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |

Continued



ABOVE: JSC2008-E-012993 --- The STS-122 Orbit 1 Flight Control Team pose for a portrait in the Space Shuttle FCR at the JSC MCC. Flight Director Mike Sarafin (center right) holds the STS-122 mission logo.

BELOW: JSC2008e020392 --STS-122 Ascent FCT poses with the crew in JSC MCC. FD Norm Knight (left) & CAPCOM Jim Dutton hold the mission logo. Crew pictured are CDR Frick, PLT Poindexter, Melvin/MS, Walheim/MS, & Schlegel/MS. (Not pictured was Love/MS.)



- Landing occurred at KSC on Wednesday 02/20/08 at 9:07 AM EST, 46 years to the day after the first American, John Glenn, orbited the
- Daniel Tani returned home after 120 days.

SIGNIFICANT ANOMALIES:

- Overexposed video due to suspect AVIU
- Fuel Cell 3 O₂ flowmeter is erratic.
- During flight, Port AFT MPM Pedestal Stow indications came on approximately 11 hours after actual stow.
- SSOR #1 intermittent comm dropouts Suspect indication of possible IML crack on noted tile
- CCTV black and white video shows intermittent color.
- Mid Port Payload Bay Floodlight not illuminating SRB:
- One of the three main parachutes on BI-132 LH showed significant damage in the canopy. **RSRM**
- Missing piece of forward factory joint weather seal, RSRM-99B SSME: None

- ET-124 Post Launch camera and film review showed LH2 acreage foam loss at Sta. 1160 during Launch. A crack in the +Y SRB Pal Ramp was observed prior to the ET-125
- tanking test on 12/18/07.
- A crack in the +Y Longeron Closeout was observed during the post-drain walkdown after the ET-125 tanking test on 12/18/07.

 During the first launch attempt of ET-125 on 12/06/07, ECO/S #3 and
- #4 failed wet
- STS-122/ET-125 launched on 02/07/08. Post Launch camera and film review showed LH₂ acreage foam loss at Sta. 1145 during Launch.
- STS-122/ET-125 Post Launch camera and film review showed TPS losses at the intertank to Lh2 flange closeout at two locations.
- High-speed data dropouts during LaunchTrajectory Server GPS time misconfiguration

- Stinger tile observed falling after SSME startup
- Ku-Band radiated in Hi Power
- Unexpected debris/expected debris exceeding mass allowable prior to pad clearance (liftoff debris)
- I/T to LH₂ Flange closeout foam loss
- 2 locations of red foreign material located on SRB
- LO₂ Umbilical Cable Tray foam loss (aft of Xt-2058)
 STS-122 LH₂ ECO failure
- LH2 acreage loss adjacent to Xt 1129 LO2 Feedline base closeout
- LH2 acreage loss aft of +Y bipod
- Missing/peeled SF-EPDM on RH Forward Segment Factory Joint

- IELK Seat Liner Transfer at 040:23:20Z (5:20 PM CST, Feb. 9, 2008). At that time Daniel Tani became a member of STS-122 and Leopold Eyharts/ESA joined the ISS Expedition 16 as Flight Engineer.
- Due to crew health issue, EVA1 postponed from FD4 to FD5 FD5 EVA 1: EV1 and EV3 (sub for EV2, health issue) performed Columbus prep activities: connected data, power, and communications lines; removed LTA cable and CBM seal cover: installed PDGF; performed NTA prep activities; and stowed OTSD. Columbus second stage bolting completed at 3:44 PM CST Monday, 02/11/08. EVA1 duration 7h58m FD7 EVA 2: EV1 and EV2 completed primary task to R&R a

- spent Nitrogen Transfer Assembly, outfit Columbus with trunnion covers, and repair Lab MMOD shield. EVA 2 duration 6hr45m The OMS Pod stinger tile was cleared for entry.

 FD9 EVA 3: EV1 and EV3 transferred SOLAR to Columbus, installed Columbus keel pin cover and handrail, transferred CMG to PLB, transferred EuTEF, and performed Airlock handrail damage swatch test. EVA 3 duration 7h25m
- EVA NOTE: One EMU glove from STS-122, S/N 6197, had a 3/16-inch hole in the Vectran of left thumb that wasn't seen until postflight inspections on the ground. S/N 6197 was Rex Walheim's left glove worn on all three EVA's (per STS-123 03/11/08 MMT notes).
- European Flight Controllers told the crew they had successfully completed initial activation of Columbus with the module's computer systems. German Chancellor Angela Merkel called to congratulate the crew.
- FD9: To clear the path to shoot down a crippled spy satellite, NASA agreed to open its California landing strip on Wednesday, 02/20/08 so Atlantis could land that day, even if weather was bad at KSC. "The reason is to give the military the biggest possible window and maximum flexibility to ensure the success of the satellite intercept" per Lead Shuttle Flight Director Sally Davis.
- Transfers:
- Hardware transferred to ISS (outside and inside): 30404 lbs
- Columbus ESA Laboratory: 26627 lbs
- Hardware/supplies transferred from ISS: 3585 lbs
 H₂O transferred to ISS: 1386 lbs
- O₂ transferred to ISS: 95 lbs
- N₂ transferred to ISS: 27 lbs
- FD10: Reboost at 047:12:17:00.0Z resulted in 187.8 by 177.6 nm orbit (first reboost since December 2002). ISSP estimated prop savings to get 400 lbs of logistics gains.
- Undocked at 049:09:24:40Z followed by a flyaround (1/2 lap) Separation Burn 1 at 049:10:34:02.0Z resulted in 188.1 by 175.8 nm orbit
- Separation Burn 2 at 049:11:01:30.0Z resulted in 187.9 by 175.5 nm orbit
- No communications blackout during Entry.

| | | | | LANDING SITE/ | SSME-TL | | | | | | |
|-----------------|---|---|---|----------------------------------|-----------------------------|-----------------|-----------|--------------------------------------|-------|-------------------------------------|--|
| | | CREW (6+1 UP/6+1 DN) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (0+1 UP/0+1 DIN) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, WINDS | PROFILE ENG. S.N. | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-123/ | 0V-105 | CDR: | KSC 39A | KSC 15 (KSC 68) | 104/104/109% | BI-133 | 51.6 | DIRECT | OI-32 | CARGO: | BRIEF MISSION SUMMARY: STS-123/1JA (25th ISS mission) |
| ISS 1JA | (Flight 21) | Dominic L. Gorie | 071:06:28:147 | 087:00:39:06Z | 104/104/107/0 | | (25) | INSERTION | (3) | 38915 LBS | delivered the first pressurized component of the Japanese |
| | ÈNĎEAVÓUR | (Flt 4 - STS-91, STS-99, STS-108) | 2:28:14 AM EDT (P) 2:28:14 AM EDT (A) | 8:39:06 PM EDT Wednesday (16) | PREDICTED: | RSRM 101 | | POST OMS-2: | | PAYLOAD | Kibo Laboratory to ISS, delivered a Canadian robotic device called Dextre, and provided five spacewalks. Endeavour's 16- |
| SEQ | OMS PODS: | P756/R242/V157/M211 | Tuesday (17) | 03/26/08 (9) | 100/104.5/104.5 72/104.5 | 5/ | | 124.9X84.8 NM | | CHARGEABLE: | day flight was the longest shuttle mission to the ISS. The |
| FLT #122 | LPO3-32 RPO4-28 | PLT: | 3/11/08 (9) | DEORBIT BURN: | 72/104.5 | ET-126 | | | | 30762 LBS | Japanese Experiment Logistics Module Pressurized Section (ELMPS or JLP), the smaller of two pressurized modules of |
| KSC-122 | FRC5-21 | Gregory H. Johnson P757/R322/M278 | <u>LAUNCH WINDOW</u> : 4M54S | 086:23:33:13.9 Z | ACTUAL: | SLWT 30 | | | | <u>DEPLOYED</u> : 29442 LBS | Kibo, was attached temporarily to a docking port on the |
| N3C-122 | | | (PLT IN-PLANE) | XRANGE: 187.7 NM | 100/104.5/99/ | | | | | | space-facing side of Harmony. Kibo, which means "hope," is |
| PAD 39A-45 | | MS 1/EV2: Robert L. Behnken | EOM PLS: KSC | ORBIT DIR:A/R (14) | 72/104.5 | FT | | DEORBIT: | | <u>NON-DEPLOYED</u> : 1132 LBS | the major Japanese (JAXA) contribution to the Station, and will increase its research capability in a variety of disciplines. |
| | | P758/R323/M279 | TAL: ZZA | | 1 = 2047 (11) | <u>IMPACT</u> : | | HA 190.0 NM | | | The robot Dextre is designed somewhat like the human form with a torso, a head area (camera), and arm appendages. It |
| MLP-3 | | MS 2/FV3: | <u>TAL WX</u> : BEN | AIM PT: NOMINAL | 2 = 2044 (10) | MET | | HP 22.5 NM | | MIDDECK: 188 LBS | rides on the SSRMS as a "dexterous tool for ORU changeout |
| OFTLI | | MS 2/EV3: Michael J. Foreman | SELECTED: | MLGTD: 2174 FT | 3 = 2054 (7) | 1:14:05 | | ENTRY | | | without requiring a space walk." This mission included |
| 25TH SHUTTLE | | P759/R324/M280 | RTLS: KSC 15 N/N TAL: ZZA 30L N/N | 087:00:39:06Z VEL: 202 KGS | M 3 EOM: | LAT: | | <u>VELOC</u> ITY: 25859 FPS | | <u>SHUTTLE</u> ACCUMULATED | representation of all five Station partner interests - the U.S., Japan, Canada, Russia, and the European Space Agency |
| FLIGHT TO | | MS 3: Takao Doi, JAXA | (MRN: NO-GO) Aoa: Nor 23 N/N | 200 KEAS HDOT: -1.8 FPS | WEIGHT: | 36.723S | | <u>ENTRY</u> | | WEIGHTS: | (ESA). |
| ISS | | (Flt 2 - STS-87) | 1ST DAY PLS: | | 208629.5 LBS | LONG: | | RANGE: | | DEPLOYED: | KSC W/D: OPF: 159. VAB HB-1: 7. PAD A: 23 = 189 Total Work |
| | | P760/R231/V195/M201 | EDW 04 N/N | <u>TD NORM 195</u> : 2707 FT | X CG: | 158.957W | | 4402 NM | | 1423027 LBS | Days (+ 14 holidays @ OPF) |
| 10 m | | MS 4/EV1: | TDEL: | | 1080.57 IN | | | | | NON-DEPLOYED: | LAUNCH POSTPONEMENTS: |
| | | Richard M. Linnehan (Flt 4 - STS-78, STS-90, | 0.000 (P) -0.288 (A) | DRAG CHUTE: DEPLOY:192 KEAS | LANDING: | | | | | 1601668 LBS | - Added STS-123 to FDRD - launch date of NET 12/08/07 on |
| 177 | THE REAL PROPERTY OF THE PARTY | STS-109) | <u>MAX Q NAV:</u> 754.38 (P) 758.53 (A) | 087:00:39:107 | WEIGHT: | | | | | CARGO TOTAL: | 11/14/06 - Postponed to 02/14/08 on 04/16/07. Slip due to STS-117 |
| ONEMAN | 501 5. | P760/R214/V150/M187 | 754.38 (P) 758.53 (A) | NLGTD: 5351 FT 087:00:39:16Z | 208762 LBS | | | | | 3901248 LBS | rollback . |
| | | MS 5 UP/EV4/EXP 16/17 FLT ENG: | <u>SRB STG</u> : 2:05.44 (P) 2:04.64 | VEL: 161 KGS 158 KEAS | X CG: 1081.8 IN | | | | | PERFORMANCE MARGINS (LBS): | Postponed to 03/11/08 on 01/28/08. Slip due to ECO sensor problems experienced during December launch attempt of |
| | | Garrett E. Reisman | (A) | HDOT: -4.6 FPS | 1001.0111 | | | | | FPR: 2651 | STS-122 |
| | | P761/R325/M281 | PERF: NOMINAL | BRK INIT: 57 KGS | | | | | | FUEL BIAS: 1063 FINAL TDDP: 2109 | LAUNCH SCRUBS: None |
| XV | | MS 5 DN/EXP 16 FLT ENG: | | | | | | | | RECON: 5128 | |
| | | Leopold Eyharts, ESA (UP on STS-122, Stay on | <u>2 ENG TAL (ZZA)</u> : 2:39 (P) 2:41 (A) | DRAG CHUTE JETTISON: 58 KGS | | | | | | PAYLOADS: | LAUNCH WINDOW: Total launch window was 9 minutes 44 seconds with window open |
| | | ÌSS. Also flew on MIR Feb | - () | 087:00:39:55Z | | | | 1 | | | at 071:06:23:20Z and close at 071:06:33:04Z. Preferred Launch |
| | | 1998.) P762/R321/M277 | NEG RETURN: 3:54 (P) 3:55 (A) | BRK DECEL FPS ² : | | | | 5 | | <u>PLB</u> : ISS-1JA (JAXA | Time was 071:06:28:14Z (In-Plane Time) for a launch window of 4m54s. |
| | | | PTA (U/S 158 FPS): | AVE 2.7 PK 4.1 | | | | Ø | | LOGISTICS MODULE) | |
| | | | 5:04 (P) 5:01 (A) | WHEELS STOP: | | | | | | , | Chief Astronaut Steve Lindsey flying the Shuttle Training Aircraft said, "It's a really nice night out here." PAO: "Florida's east coast |
| | | SS EVA 117 DOCKED QUEST EVA 40 | SE TAL (ZZA 104): | 087:00:40:36Z 13629 FT | | | | | | MIDDECK: ISS-1JA | is about to get an early sunrise!" |
| | | EMU/TETHERED EVA 110 | 5:57 (P) 6:04 (A) | | | | 0 | Secon | | | 3 , |
| | | SCHEDULED EVA 108 DURATION 7:01 | PTM (U/S 181 FPS): | ROLLOUT: 11455 FT | | | 2 15 | | | 5 CRYO TANK SETS | LAUNCH DELAYS: None. Launch occurred on time at 2:28 a.m. EDT, Tuesday, March 11, 2008. An eclipse of the GOES-East |
| | | | 6:05 (P) 6:03 (A) | 1:30 M:S | | | the state | Mar | | | weather satellite prevented using any satellite imagery in the hour prior to launch. Fortunately, the low clouds remained well |
| 60 C | | SSA EVA 118 DOCKED QUEST EVA 41 | SE PRESS 104: | | | | 1 | | | RMS (79) | behaved as skies were cloudy but above the range safety and |
| | \$15-123 | EMU/TETHERED EVA 111 SCHEDULED EVA 109 | 6:56 (P) 6:57 (A) | | | | | March 2008) | | ODS OBSS | Return to Launch Site (RTLS) cloud ceiling limits. |
| | IU/A | DURATION 7:09 | | | | | | 5500 ft provided a | | SSPTS | Continued |
| | -0.00 | Continued | Continued | Continued | | | 9 | age as the cloud uttle's exhaust. | IS | | |
| | | oonanaca | | | | growed froiti | uic Jill | attie 3 extraust. | | | |

| FLT NO. | ORBITER | CREW (6+1 UP/6+1 DN) TITLE, NAMES & EVA'S | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS | SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N. | SRB RSRM AND ET | ORBI | | FSW | PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
|----------------------------------|---------|--|---|---|--|--|--|---|--|--|--|
| STS-123/ ISS 1JA Continued | | Continued SS EVA 119 DOCKED QUEST EVA 42 EMU/TETHERED EVA 112 SCHEDULED EVA 110 DURATION 6:47 SS EVA 120 DOCKED QUEST EVA 43 EMU/TETHERED EVA 111 SCHEDULED EVA 111 DURATION 6:24 SS EVA 121 DOCKED QUEST EVA 44 EMU/TETHERED EVA 114 SCHEDULED EVA 112 DURATION 6:02 | Continued MECO CMD: 8:23.6 (P) 8:22.6(A) VI: 25819 (P) 25817.6(A) OMS-2: 38:15 (P) 38:30 (A) 97.4 FPS 96.1 FPS | Continued WINDS: 1.5T 1.3L KTS OFFICIAL: 01002P03 KTS 2H 2R KTS | | The state of the s | | | : | | Continued TAL WEATHER: Weather at the TAL sites was tricky as showers were monitored near Zaragoza, Spain and Istres, France during the launch countdown. Post cold front low level wind flow from the northwest brought showers to the windward sides of the Pyrenees and central French mountains. These showers dissipated as they crossed the high terrain. TAL weather was GO. PERFORMANCE ENHANCEMENTS: Include the standard set plus: 1) PE Operational High Q WIN/MAR, 2) OMS Assist, 3) A 52 nm MECO, and 4) Del Psi FLIGHT DURATION CHANGES/LANDING: Deorbit burn was planned for 086:21:58:14Z. Due to low clouds moving in at KSC, the deorbit burn was delayed to second opportunity at 086:23:33:13.9Z. Landing occurred at 087:00:39:06Z, Wednesday, 03/26/08, at 8:39:06 PM EDT. |
| | | MCC WHITE FCR (52) FLIGHT DIRECTORS: SHUTTLE: ASC - B. C. Lunney LD/O1 - M. P. Moses O2 - R. E. LaBrode PLNG - M. R. Abbott ENT - R. S. Jones MOD - P. L. Engelauf Team 4 - R. S. Jones/ A. J. Ceccacci ISS: LD/O2 - D. J. Weigel O1 - K. L. Alibaruho O 3 - G. Kerrick Team 4 - H. L. Rarick IP FD - E. J. Nelson (I/F W/CSA & JAXA) CAPCOMS: SHUTTLE: A/E - J. P. Dutton K. A. Ford (WX) LD/O1 - T. W. Virts O2 - N. J. Patrick PLNG - B. A. Drew Team 4 - N/A Continued | | ISS016-E-033I ISS CDR Pegg front), and Gar Eyharts/ESA (icrew. Leaving (second left, re Doi/JAXA MS | are visible in 684 Crews: S' gy Whitson (secrett Reisman/Fright rear), form | TS-123 (grond right, E (left realer Exp16 tts are the cry H. Johr ek Linneha | reen shirts) reen, Yuri r). Also in g FE, who ha Endeavour ason (behin n/MS (behin | & ISS Ex. Malenchers moved of Crew CD d Malencher and Doi); Malenchers model of Crew CD d Malenchers model of Colon (1997); Malenchers model of Crew CD d Malenchers model (1997); Malenchers model | p 16 (February 16 Per 1 | blue shirts), FSA FE (left, opold on the STS-123 minic Gorie of the STS-123 | FIRSTS/LASTS: First 16-day Space Station Assembly Mission, 12 days docked. (Longest mission is STS-67 - Spacelab, 16D 21H 47M 35S.) Tied the current mission record of five spacewalks held by the HST Servicing Missions (STS-61, STS-82, and STS-109). Most EVA's docked to ISS. A redesign to RSRM Nozzle Joints 2 and 5, the latter with an additional bolt enhancement, follows up the new Nozzle-to-Case J-leg Joint insulation configuration that debuted on STS-122's motors. First flight of a lighting system derived from an off-the-shelf flash (Nikon SB800) was added to a digital camera (in orbiter umbilical well) to capture photos of ET after separation for about 130 ft away. This is the last modified tank (before Columbia) and the next will be a tank built with all mods done in line. First on-orbit test of orbiter tile repair technique. First time the OBSS was left on the Station so that the next flight can deliver the large JAXA Kibo module. This mission marks a significant milestone with the inauguration of the JAXA IP support to real-time operations, adding them to the fold with ESA, CSA, and Russia. "We have reached a new pinnacle in the 'international' part of the Space Station operations." Spacelab Logistics Pallet (SLP) used by Dextre made its fourth and final flight to space, "concluding a long history that can be traced back before the first shuttle left the launch pad." - PAO. First flight with John Shannon as Shuttle Program Manager. NOTE: The unmanned cargo ship Jules Verne, the ESA's first Automated Transfer Vehicle (ATV), launched toward ISS on March 7. It was parked well away from ISS at a safe distance until Endeavour's departure. |

(second right, center row); Robert L. Behnken/MS (far left, center row).

| FLT | ORBITER | CREW (6+1 UP/6+1 DN) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|----------|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-123/ | | Continued | | | Y | (3/A | | XXXXX | XXX | | Continued |

ISS 1JA Continued O1 - Z. Jones LD/O2 - S. K. Robinson O3 - M. T. Vande Hei Team 4 - R. C. Dempsey



S123-E-006403 --- Linnehan & Foreman assemble the stickfigure Dextre including attaching its two arms during EVA 2.



S123-E-007088 (18 March 2008) --- Canada's two armed robot, Dextre, is shown in the grasp of the station's robotic Canadarm2.



S123-E-006089 --- Reisman, Exp 16 & Linnehan (out-of frame) prepare tool change out mechanisms on Dextre during EVA 1.



S123-E-006729 --- Linnehan (right) & Behnken install a spare-parts platform and tool-handling assembly for Dextre during EVA 3.

NIGHT LAUNCH #30: Shannon: "We are launching in the dark."

NIGHT LANDING KSC #16: (#22 in Shuttle history)

RENDEZVOUS #70: Rendezvous and dock with ISS

- <u>EVENTS:</u>
 OMS2 ignition at 071:07:06:44.0Z resulted in a 124.9 by 84.8 nm orbit
- SRMS OBSS/LDRI survey of nosecap and port and starboard wing RCC (WLE's) was completed.
 TI maneuver at 073:00:42:21.9Z resulted in a 186.3 by 180.6

- R-Bar Pitch Maneuver was performed. No issues Docking contact occurred at 073:03:46:54Z. Hard Dock occurred at 073:04:02:11Z ISS Hatch opened at 073:05:36:00Z, 12:36 AM CDT, Thursday,
- March 13, 2008, ISS crew welcoming
 IELK Seat Liner Transfer at 073:07:50Z (2:50 AM CDT, March
 13, 2008). At that time Leopold Eyharts/ESA became a member of STS-123 and Garrett Reisman joined the ISS Expedition 16/17 as Flight Engineer.
- 16/17 as Flight Engineer.

 The first transfer item after hatch opening was swapping Garrett Reisman/MS for Leopold Eyharts (ESA)/Expedition 16 FE. The transfer was official when the form-fitting Soyuz seatliners were swapped. Eyharts spent 33 days as a member of ISS Expedition 16. With the on-time landing of March 26, Eyharts spent a total of 48 days in space.

 FD4/5: EVA 1: EV1 & EV4: JLP prepped for unberthing, shuttle robot arm grappled JLP, Orbital Replacement Unit (ORU) and Tool Changeout Mechanism installed on the Canadian Special Purpose Dexterous Manipulator (SPDM or Dextre) arm 2 and arm 1, shuttle arm unberthed JLP, and shuttle arm installed JLP onto Harmony zenith port (temporary location until Kibo delivery on STS-124). Unable to provide keep-alive power to SPDM (later determined to be flawed cable in pallet). EVA 1 duration 7:01
- FD6: While Expedition 16 and STS-123 crewmembers brought the Kibo logistics module to life, Dextre's power supply unit was
- the Kibo logistics module to life, Dextre's power supply unit was brought to life via the SSRMS.
 FD6: EVA 2: EV1 & EV3: EVA ran long due to problems with the SPDM Arm Expandable Diameter Fasteners (EDF's) not releasing per procedure. Crew ended up using a pry bar. Time didn't permit removing some of the SPDM blankets. EV3 experienced RTV delamination. Per Rule (1JA_C2-105), EMU OVERGLOVE EXCEPTIONS, crew continued the SPDM assembly task without donning overgloves due to the thermal constraints on SPDM. EV3 donned overgloves once the thermal critical tasks were complete. ISS multimeter was repaired and would later be swapped with shuttle multimeter prior to hatch closure. Installed the Node 2/JLP vestibule barrier assembly. EVA 2 duration 7:09 assembly. EVA 2 duration 7:09

Continued.

duration 7:01

| FLT | ORBITER | CREW (6+1 UP/6+1 DN) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |

STS-123/ ISS 1JA Continued...



S123-E-009262 (24 March 2008) --- The ISS latest configuration is viewed from Endeavour post-separation.

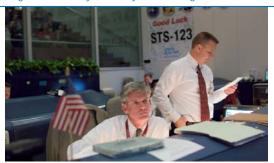


JSC2008-E-025177 --- Flight Controller Bill Foster in JSC MCC during launch countdown activities.



JSC2008-E-025187 --- Astronaut George Zamka, Spacecraft Communicator (CAPCOM), monitors data during launch countdown.

Flight Directors Bryan Lunney & Norm Knight in JSC MCC



SIGNIFICANT ANOMALIES: Orbiter:

- Sensor Unit S/N 1150 on the port wing had excessive triggers (quantity 4452) during the first hour of MMOD monitoring for Late Inspection.

Integrated Sensor Inspection System Sensor Pack 1 Pan Tilt Unit 10 degrees offset

-DCS OI1 card 1 failure

- FES shutdown on Primary A Controller - GG Chamber pressure indicated a shift upward

- APU 1 fuel tank pressure decay

-LH OMS Pod mid surface temperature -Sensor Unit 1150 (Ref Des: 65V08A01) on the port wing

-APU 3 seal cavity drain line pressures indicate slow decay.

- Body Flap tile damage

- Aft arrowhead damage

- STBD FWD RAD Retract Flexhose did not fully retract into RRSC

-STBD FWD RAD Retract Flexhose did not fully retract into RRS (ref SPC# 205181853).

-APU 1 Gas Generator Chamber Pressure Transducer shift
-Cabin Temp Controller 1 noisy

-MPS E-3 LOX Inlet pressure showed a shift of 30 psi at Liftoff.
-MADS PCM MSRMNT gradually and abruptly moved to OSH throughout the MADS and MMU1/SSR1 recording phase.

Llost OMS POD (RH OMS024) putty repair
- Damage to the V070-391044-174 (BRI-18) tile
- Damage to the V070-191101-043 (BRI-18) tile

SRB:

- Loss of data from SRB RH ET Observation Camera during Ascent

RSRM: None SSME: None ET: None

MOD: -White-VTS-Servers hung

Integration: - Unexpected debris/expected debris exceeding mass allowables

prior to pad clearance (Liftoff debris) - Stub Tile damage during SSME ignition

-Tile chips on orbiter stingers during SSME ignition

Continued

FD8: RTV Loss in EVA Gloves: EV3's gloves were NO-GO for subsequent EVA's. First spare set used on EVA 4.

FD8: EVA3: EV1 & EV2: Finished assembly of Dextre, including installation of tool holder assembly and a Camera Light Pan Tilt Assembly (CLPA) which serves as Dextre's eyes. Also, the Spacelab Logistics Pallet used for assembly was prepared for return to shuttle cargo bay. Attempted to install MISSE-6 experiment (unsuccessful - moved to EVA5). EVA 3 duration 6.62

FD10: Japanese Prime Minister called to congratulate the crew. FD10: During press interview, asked to describe the fast-growing Space Station, Reisman said the crew was struck by the view during final approach and similarities with the famous space Station scene in the movie "2001: A Space Odyssey" by Stanley Kubrick and Arthur C. Clarke. Clarke died during this mission on 3/19/08 at the age of 90. Clarke in "First on the Moon" stated, "The inspirational value of the space program is probably of far greater importance to education than any input of dollars... a whole generation is growing up which has been attracted to the bard disciplines of science and excitoscipe by attracted to the hard disciplines of science and engineering by the romance of space."
FD11: EVA4: EV2 & EV3: Tasks were Remote Power Control

Module removal and replacement, and the Tile Repair Ablator Dispenser (T-RAD) detailed test objective worksite setup and demonstration. The demonstration was considered a "huge" success, but needs results from post-landing detailed analysis. EVA 4 duration 6:24

FD13: EVA 5: EV2 & EV3: Primary tasks completed were positioning of OBSS to temporary home on ISS truss, installation of MISSE-6 experiment, and inspection of SARJ. EVA 5 duration 6:02

FD14: Conducted Rigidizable Inflatable Gas Experiment (RIGEX) funded by the Air Force. RIGEX was designed to test how well ground models and computer simulations predict what happens to the inflated structures in weightlessness. Once rigid, the sample tubes aboard Endeavour were blasted with vibrations to test their structural integrity. The experiment was returned to Earth aboard the shuttle for further scientific analysis.

Transfers:

• Hardware transferred to Station (outside and inside: 25839 lbs

Hardware transferred to Station (outside): 23776 lbs
 Hardware transferred to Station (inside): 1432 lbs
 Japanese pressurized logistics module: 18377 lbs
 Dextre - Special Purpose Dexterous Manipulator: 3431 lbs
 Middeck items returned from ISS aboard Endeavour: 1565 lbs

Water transferred to Station: 608 lbs

Water transferred to Station: 608 lbs
Oxygen transferred to Station: N/A
Nitrogen transferred to Station: 23 lbs
Undocked at 085:00:25:00Z followed by a flyaround (1/2 lap). (Undocking was delayed 29 minutes due to two ISS Beta Gimbal Assembly (BGA) latch aborts.)
Communications blackout time during Entry: 6m
NOTE: Currently, 590826 lbs mass in space of the ISS and ISS

assembly 70% complete.

| | | I | | LANDING CITE/ | COME TI | 1 | | | | ı | |
|------------------|--------------------------|---|--|----------------------------------|-----------------------|---------------------------|--------------|-----------------------------------|---------------|-----------------------------|--|
| | | CREW | LAUNCH SITE, | LANDING SITE/ RUNWAY, | SSME-TL NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (6+1 UP/6+1 DN) | LIFTOFF TIME. | CROSSRANGE | EMERG | RSRM | | ORDIT | FSW | WEIGHTS. | (LAUNCH SCRUBS/DELAYS, |
| NO. | GRETTER | TITLE NAMEC | LANDING SITES. | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | TITLE, NAMES & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | , i | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | & EVA 3 | | WINDS | ENG. S.N. | | | | | | |
| | | CDR: | KSC 39A 152:21:02:12Z | KSC 15 (KSC 69) 166:15:15:18Z | 104/104/109% | BI-134 | 51.6 (26) | DIRECT INSERTION | OI-32 (4) | <u>CARGO</u> : 41997 LBS | BRIEF MISSION SUMMARY: STS-124/1J (26th ISS mission) |
| STS-124/ | OV-103 | Mark E. Kelly (Flt 3 - STS-108, STS-121) | 5:02:12 PM EDT (P) 5:02:12 PM EDT (A) | 11:15:18 AM EDT | PREDICTED: | RSRM 102 | (20) | | (+) | 41997 LDS | delivered the second and main segment of the Japanese (JAXA) Station Kibo (Hope) Laboratory. This segment |
| ISS 1J | (Flight 35) DISCOVERY | P763/R271/V181/M237 | 5:02:12 PM EDT (A) | Saturday (22) | 100/104.5/ | 102 | | POST OMS-2: | | <u>PAYLOAD</u> | known as the Japanese Pressurized Module (JPM) is the |
| SEQ | | DI T | Saturday (7) 05/31/08 (7) | 06/14/08 (8) | 104.5/72 104.5 | ET-128 | | 170.3x125.0 NM | | CHARGEABLE: 33969 LBS | ISS's largest laboratory measuring 14.4 feet in diameter and |
| FLT# 123 | OMS PODS: | PLT: Kenneth T. Ham | | DEORBIT BURN: | | | | | | 33909 LBS | 36.7 feet long. The Kibo complex also includes: An airlock and two robotic arms also delivered on this flight; the |
| KSC-123 | LPO1-38 RPO3-36 | P764/R326/M282 | LAUNCH WINDOW: 6M 47S (PLT IN- | 166:14:10:12Z | ACTUAL: 100/104.5/ | SLWT 31 | | | | DEPLOYED: 33890 LBS | Japanese Experiment Logistics Module Pressurized |
| K3C-123 | FRC3-35 | MS 1/Robotics: | PLANE) | XRANGE: 270.2 NM | | 31 | | | | 33890 LBS | Section (launched on STS-123); and an exterior platform for |
| PAD 39A-46 | 1105 55 | Karen L. Nyberg | FOM DLC: KCC | ODDIT DID: A/I 20 | 104.5 | | | | | NON-DEPLOYED: | experiments exposed to space, scheduled for delivery on STS-127. The STS-124 mission is the first in which the |
| MLP-3 | | P765/R327/F45 | EOM PLS: KSC TAL: MRN | ORBIT DIR: A/L 39 | 1 = 2051 (7) | FT | | | | 0 LBS | JAXA Flight Control Team activated and controlled a |
| IVILP-3 | | MS 2/EV2: | TAL WX: FMI | <u>aim Pt</u> : Nominal | 2 = 2048 (8) | <u>IMPACT</u> | | | | | module from Kibo Mission Control in Tsukuba, Japan. |
| 26TH | | Ronald J. Garan | SELECTED: | MLGTD: 2100 FT | 3 = 2058 (2) | MET | | | | MIDDECK: 79 LBS | Also, as the STS-124 launch countdown got underway, a |
| SHUTTLE | | P766/R328/M283 | RTLS: KSC 15 N/N | 166:15:15:17Z | | 1:14:18 | | | | 77 LD3 | special Russian pump was added to Discovery's manifest to fix "a balky toilet" on the ISS. |
| FLIGHT TO ISS | | MS 3/EV1: Michael E. Fossum | TAL: MRN 20 N/N (ZZA NO-GO) | VEL: 209 KGS 208 KEAS | | LAT: | | | | SHUTTLE ATER | , |
| 133 | | Michael E. Fossum | AOA: KSC 15 N/N | HDOT: -2.1 FPS | | 36.362S | | | | ACCUMULATED WEIGHTS: | KSC W/D: OPF: 157, VAB HB-1: 7, PAD A: 29 = 193 Total Work Days (+ 13 Holidays @ OPF) |
| | | (Flt 2 - STS-121) P767/R296/V196/M259 | 1ST DAY PLS: EDT | | M 3 EOM: | | | | | DEPLOYED: | Days (+ 13 nolldays @ OPF) |
| | . | | 22 N/N | TD NORM 195: 3172 FT | WEIGHT: | <u>LONG</u> : 158.449W | | | | 1456917 LBS | LAUNCH POSTPONEMENTS: |
| (A) | T. C. | MS 4/Robotics: Akihiko Hoshide | TDEL: | | 203604.5 LBS | 130.777 | | DEORBIT: | | NON-DEPLOYED: | - Added STS-124 to FDRD - launch date of 02/28/08 on 02/20/07. - Ppd. to 04/24/08 on 04/16/07. Slip due to STS-117 rollback. |
| | | (Japan) | 0:000(P) -0.508(A) | DRAG CHUTE DEPLOY: | X CG: | | | HA 190.6 NM HP 23.3 NM | | 1601747 LBS | - Ppd. to 05/25/08 on 03/07/08. Slip due to ET delivery delay and |
| The Car | | P768/R329/M284 | MAX Q NAV: | 194 KEAS | 1088.03 IN | | | TP 23.3 INIVI | | | Beta Angle restriction Ppd. to 05/31/08 on 04/03/08. Slip due to adverse weather |
| 911 | 1 | MS 5 UP/Stay as EXP 17/18 | 715.16(P) 701.98(A) | 166:15:15:20Z | LANDING | | | ENTEN | | CARGO TOTAL: 3943245 LBS | conditions affected on dock delivery date of ET-128. |
| ~~ | | FLT ENG: | SRB STG: | NLGTD: 5601 FT | <u>LANDING</u> : | | | <u>ENTRY</u> <u>VELOCITY</u> : | | 3943240 LD3 | * |
| | | Gregory E. Chamitoff P769/R330/M285 | 2:03:36(P) 2:02.56(A) | 166:15:15:28Z | WEIGHT: | | | 25866 FPS | | <u>PERFORMANCE</u> | LAUNCH SCRUBS: None |
| | | | PERF: NOMINAL | VEL: 155 KGS 148 KEAS | 203558.5 LBS | | | ENTRY | | MARGINS (LBS): FPR: 2651 | LAUNCH WINDOW: |
| JOHNO . | REISMAN | MS 5 DN/EXP 16/17 FLT | | HDOT: -7.0 FPS | X CG: | | | RANGE: 4396 NM | | FUEL BIAS: 1063 | Total launch window was 7 minutes 45 seconds with window open at 152:21:01:14Z and close at 152:21:08:59Z. Preferred Launch |
| | | ENG: Garrett E. Reisman | 2 ENG TAL (ZZA): | DDV INIT 33 VOC | 1090.00 IN | | | 4396 NM | | FINAL TDDP: 1308 | Time was 152:21:02:12Z (In-Plane Time) for a launch window of |
| W KOB | NTOFF. | (Up on STS-123, stay ISS) | 2:48(P) 2:47(A) | BRK INIT: 77 KGS | | | | | | RECON: 2513 | 6m47s. |
| | 47/ | P770/R325/M281 | NEG RETURN: | DRAG CHUTE | | | | | N September 1 | PAYLOADS: | LAUNCH DELAYS: None. |
| | | SPECIAL EDUCATOR | 3:48 3:55 | JETTISON: 54 KGS | · V | | | 24 | | PLB: ISS 1J | Launch occurred on time at 152:21:02:12Z, 5:02:12 p.m. EDT, |
| | | "Buzz" Lightyear | PTA (U/S 159 FPS): | 166:15:15:59Z | | | r de la | | | ISS 1J | Saturday, May 31, 2008. On launch day, the sea breeze pushed |
| | | (UP/EXP 18) See "Firsts" | 5.10 5.73 | BRK DECEL FPS ² : | | | | | | MIDDECK: | across KSC with showers just west of the launch pad several |
| | | 000 111303 | SE TAL (FMI 104): | AVE 4.8 PK 6.3 | | A | | | 1/1 | ISS 1J | hours before launch time. However, the sea breeze had pushed |
| 166 | N-70 1 | W 7 2 1 | 6:08 6:13 | | Line of the last | A 10 | | | | MAUAI | west of KSC by early afternoon with near ideal conditions for |
| | | | PTM (U/S 180 FPS): | WHEELS STOP: 166:15:16:19Z | | | | 6.11 | | 5 CRYO TK SETS | launch. Thunderstorms were occurring over central Florida but were well outside the 20 nautical mile thunderstorm flight rule limit. |
| | | | 6:18 6:29 | 11421 FT | | | | | po | | "Nice day to send 'Hope' to the ISS" – PAO. Cain: "If you |
| | 40 | | SE PRESS 104 | ROLLOUT: | 2122 | | | A Long | You | SRMS (80) | watched today, you saw a flawless countdown." |
| ALL PU | | | 7:01 7:07 | 9321 FT | | MAN TO | - | du L | > 3/L | ODS, OBSS (Return Only) | 3.3 |
| | | | | 1:02 M:S | 080531"S | huttle laund | h exh | aust thrust | | Only) SSPTS | Continued |
| | | | MECO CMD: 8:24 8:26.3 | | | | | asted bricks an | nd | | onunacu |
| | | | 0.20.3 | | | | | ter fence some | | | |
| | | | | | | | | age to Shuttle. | | | |
| | | Continued | Continued | Continued | 1,000 1001 11 | om pau. IV | Jaun | ago to oriditio. | | | |
| | | Continucu | | | | | | | | | |

SRB

RSRM

AND

ET

INC

SSME-TL **NOM-ABORT**

EMERG

THROTTLE

PROFILE

ENG. S.N.

| | | | SP | ACE SF |
|---------------------------------|---------|---|--|--|
| FLT NO. | ORBITER | CREW (7) TITLE, NAMES & EVA'S | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION WINDS |
| STS-124/ ISS 1J Continued | | Continued SS EVA 122 DOCKED QUEST EVA 45 EMU/TETHERED EVA 115 SCHEDULED EVA 113 DURATION 6:48 SS EVA 123 DOCKED QUEST EVA 46 EMU/TETHERED EVA 116 SCHEDULED EVA 114 DURATION 7:11 SS EVA 124 DOCKED QUEST EVA 47 EMU/TETHERED EVA 117 SCHEDULED EVA 115 DURATION 6:33 MCC WHITE FCR (53) FLIGHT DIRECTORS: SHUTTLE: ASC - N. D. Knight LD/O1 - M. R. Abbott O2 - M. L. Sarafin PLNG - P. F. Dye/ A. J. Ceccacci ENT - R. S. Jones MOD - J. A. Mccullough Team 4 - R. E. LaBrode ISS: LD/O2 - A. P. Hasbrook O1 - R. C. Dempsey O3 - E. J. Nelson Team 4 - B. T. Smith IP FD - H. E. Ridings (I/F w/JAXA) Continued | Continued VI: 25819 25820 OMS-2: 37:20 37:21 250.7 FPS 249.1FPS | Continued WINDS: 0 KT 5 L KTS 0 FFICIAL: 07007P12 KTS 1H 12L KTS DENS ALT: 1748 FT FLT DURATION: 13:18:13:06 S/T: 1166:19:10:1 OV-103: 305:08:10:09 DISTANCE: 5,735,643 sm TOTAL SHUTTLE DISTANCE: 473,659,150 sm |



ORBIT

HA/HP

S124-E-005921 --- In the grasp of ISS robotic Canadarm2, the Kibo Japanese Pressurized Module (JPM) is moved from Discovery's payload bay to the port side of the Harmony node.



S124-E-006361 --- Fossum & Garan outfitted the outside of the JPM, installing covers and external television equipment and removing thermal covers and insulation on the JAXA RMS and top hatch.

Continued...

PAYLOAD

WEIGHTS.

PAYLOADS/

EXPERIMENTS

FSW

TAL WEATHER:

The TAL weather conditions were rather challenging. An upper low had been spinning over Spain for several days, drifting slowly to the northwest. Timing differences in the models made forecasting where precipitation would develop difficult. Initially on L-2 day, NO-GO forecasts were issued for Moron and Zaragoza, Spain with a GO forecast for Istres, France. Shuttle launches require only one of the three TAL sites have GO weather. As the upper low began to finally move to the northwest, forecasts were updated to GO for Moron, but a NO-GO for Istres. On launch day, Moron weather remained favorable and conditions at Istres improved and were GO. Zaragoza was observed NO-GO at TAL landing time.

MISSION HIGHLIGHTS

(LAUNCH SCRUBS/DELAYS,

TAL WEATHER, ASCENT I-LOADS,

FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

PERFORMANCE ENHANCEMENTS:

Include the standard set plus: 1) PE Operational High Q TRN/JUN, 2) OMS Assist, 3) A 52 nautical mile MECO, and 4) Del

FLIGHT DURATION CHANGES/LANDING: None

- FIRSTS/LASTS:

 First flight of an ET built from scratch with all of the safety modifications stemming from the 2003 Columbia accident. "This essentially is the completed return-to-flight tank," Shannon.

 First docking of Shuttle while ATV also docked to ISS.

 First OBSS transfer from ISS to Orbiter.

 First Post-Undock Inspection (Orbiter heat shield) will be the full "FD2 Inspection" done on previous missions.

 First flight of Modified EMU gloves: includes addition of Turtleskin™ patches to thumb and index finger to provide increased protection against cuts.

 A first: NASA and Disney joined forces for education. "Buzz Lightyear," a 12-inch tall action doll, based on the cartoon character from the Pixar Studios Toy Store animated movies was delivered to the ISS for a 6-month stay. While on ISS, was delivered to the ISS for a 6-month stay. While on ISS, Lightyear will demonstrate zero gravity to elementary school children.

NIGHT LAUNCH: N/A

RENDEZVOUS: #71 - Rendezvous and dock with ISS

SRB

RSRM

AND

FT

INC

ORBIT

HA/HP

SSME-TL

NOM-ABORT

EMERG

THROTTLE

PROFILE

SITE/ AY,

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING RUNWA CROSSRA |
|---------------------------------|--------------|---|-------------------------------|-----------------------------|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING FLT DURA |
| STS-124/ ISS 1J Continued | | Continued CAPCOMS: SHUTTLE: A/E - T. W. Virts - K. A. Ford (Wx) LD/O1 - N. J. Patrick O2 - B. A. Drew PLNG - S. W. Lucid Team 4 - N/A ISS: O1 - M. T. Vande Hei LD/O2 - C. J. Cassidy O3/PLNG - M. C. Jensen Team 4 - N/A | | |
| AT DICLIT | . C404 E 00E | C4E CTC 404 9 Eve 4 | 7 araus araat aaah | other cher |

AT RIGHT: S124-E-005615 --- STS-124 & Exp 17 crews greet each other shortly after docking, Left Foreground: EXP17 CDR Sergei Volkov (RSA), Left, partially obscured CDR Kelly & PLT Ham; Fossum/MS (center left), Reisman/MS (center right); Oleg Kononenko/FE EXP17/RSA (right), Garan/MS, Chamitoff/MS, & Nyberg/MS. BELOW: Hoshide/MS (JAXA), not in photo at right, works in newly installed Kibo JPM.







ABOVE: S124-E-009982 (11 June 2008) --- View of ISS configuration post Shuttle sep shows Kibo attached to Harmony at bottom center with first ESA ATV Docked at top center. AT LEFT: S124-E-010186 --- The Kibo laboratory (center left) is shown after attachment to port side of Harmony Node with: Kibo logistics module at bottom left, Columbus lab at center right, and at top center is Dextre along with two docked Russian spacecrafts.

MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS TAL WEATHER, ASCENT I-LOADS. FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

Continued...

PAYLOAD

WEIGHTS

PAYLOADS/ **EXPERIMENTS**

FSW

Shuttle launch sent asbestos 1,800 feet from pad. The 6 million pounds of thrust from Discovery's engines, channeled by the flame trench, blasted bricks, concrete rubble, and asbestos beyond a perimeter fence some 1,800 feet away. Bricks and some asbestos landed in a retention pond behind the fence. No damage to Shuttle.

OMS2 ignition at 152:21:39:32.5Z resulted in a 170.3 by 125.0 NM orbit.

NOTE: SRMS OBSS/LDRI survey of nosecap and port and starboard wing RCC (WLE's) was not performed until post undocking (no OBSS on Shuttle)

FD2: TI Maneuver at 154:15:16:26.0Z resulted in a 183.9 by 182.2 NM orbit.

R-Bar Pitch Maneuver was performed. No issues FD3: Docking Contact occurred at 154:18:03:20Z

Hard Dock occurred at 154:18:16:30Z. ISS Hatch opened at 154:19:30:00Z, 2:30 PM CDT, Monday,

June 02, 2008; welcomed by ISS crew.

IELK Seat Liner Transfer at 154:22:35Z (5:35 PM CDT, June 2, 2008). At that time Garrett Reisman became a member of STS-124 and Greg Chamitoff joined the ISS Expedition 17 as Flight Engineer.

FD4: EVA 1: Egress was delayed by about 1 hour to reconnect Fossum's comm cap - lost comm during pre-breathe. Fossum & Garan, prepared the Kibo (JPM) for its removal from the Shuttle payload bay, disconnecting cables and removing covers. JAXA MS/Hoshide and MS/Nyberg robotically removed Kibo from the Shuttle P/L bay and latched it to Harmony, Node 2. Hoshide noted: "We have a new 'Hope' on the ISS." EV1 & EV2 assisted in the transfer of the OBSS from its ISS stored position (since STS 132) back to the Shuttle. The OBSS would be used (since STS-123) back to the Shuttle. The OBSS would be used with the shuttle robotic arm on FD12 to inspect the Orbiter heat shield. EV1& EV2 also demonstrated a technique that could be used to clean the starboard SARJ, which has had limited capability for several months. EV2 installed a new bearing and EV1 verified by inspection that a spot on earlier EVA's was a divot. This will feed into further analysis of the origin of the damage. EVA 1 duration 6:48.

FD4: Based on review of launch imagery, the MMT decided that the focused inspection of the Orbiter heat shield was not

FD6: EVA 2 - Fossum & Garan outfitted the outside of the JPM, installing covers and external television equipment and removing thermal covers and insulation on the JAXA RMS and top hatch. They also loosened bolts holding two Nitrogen Tank Assemblies in place on the Station's truss. Those tanks will be swapped during EVA 3. They also retrieved a failed external television camera from the port truss. In addition, Fossum inspected the left SAPC which had been performing perfectly. inspected the left SARG, which had been performing perfectly. No shavings or debris were found, but photos were taken to be sent to the ground for review. EVA 2 duration 7:11.

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |

STS-124/ ISS 1J Continued.

> Mosaic of the Zenith and Aft Sides of the ISS During Flyaround 1J/STS-124 P5 Truss S5 Truss S3 Truss P1 Truss P6 Truss Z1 Truss S1 Truss



JSC2008-E-043220 --- John McCullough (left), chief of the Flight Director Office, part of the Mission Operations Directorate at JSC, and Bryan Lunney, Flight Director and a mission manager observe KSC launch from MCC.



STS124-S-072 --- A close look at Discovery post landing at KSC. From left: KSC Director Bill Parsons and Bill Gerstenmaier, NASA Associate Administrator for Space Operations. At right: JAXA Director of Program Management & Integration Yuichi Yamaura & VP Kaoru Mamiya.

SIGNIFICANT ANOMALIES:

- TCS Dropouts during Rendezvous - Engine # 2 Dome Heat C/P Tile Damage - Imagery Showed F3D (V070-421558-024) and F44 (V070-421558-025) Tyvek Rain Covers Released Late

- IMU 1 Z Gyro excessive drift

- The Left Hand ET Door BRI-18 Tile V070-395055-255

- Rudder Speed Brake Thermal Tab found dislodged and floating

- A buildup of ceramic adhesive identified under the Thermal Barrier

- Closed 2 Indication failed to Transfer On when door was closed

Crew reported difficulty latching the External Airlock Upper Hatch prior to Undockina

KSC: - STS-124 Pad debris items

- STS-124/BI-134rh Data Acquisition System failed to record video and obtained erroneous Accelerometer data

RSRM: None SSMF: None MOD: None

- STS-124/ET-128 Post-Launch Camera Film Review showed two foam losses (80971008428-510) on Xt 1129 LO2 Feedline Support Fitting Closeoùt

Integration:

- Unexpected Debris/Expected Debris Exceeding Mass Allowable prior to Pad clearance (Liftoff Debris)

- Late Tyvek partial cover releases

- Roll Moment during SRB Tail-off
- Liberated Refractory Brick, NE Flame Trench Wall Pad A
- ET TPS loss at ~Xt 1129, near LO₂ Feedline Bracket

Continued...

<u>FD9: EVA 3:</u> Fossum & Garan began the EVA 30 minutes ahead of schedule. The EVA was highlighted by Garan's dramatic robot ride some 80 feet over the top of the ISS to replace a 550 lb nitrogen tank on the starboard truss. The ride was dubbed the "windshield wiper maneuver" or as Mark was dubbed in e Wintoshied when Inahedver of as Mark Carreau (Houston Chronicle) headlined it: "Wild robot-arm ride caps workday at Space Station." Fossum returned to the port SARJ (inspected on EVA 2) taking particulate matter from inside the joint, using a strip of tape that was returned to Earth for analysis. He also removed thermal insulation from the Kibo robotic arm's wrist and elbow cameras and launch locks from one of the Kibo windows and deployed debris shields on Kibo. Other tasks by the pair included: The repaired video camera retrieved on EVA 2 was re-installed and several extra tasks (installation of thermal cover on Harmony, relocation of foot restraint aid, and removal of SARJ launch lock) were conducted. EVA 3 duration 6:33. Transfers:

Hardware transferred to ISS (outside & inside): 34,353 lbs
Hardware transferred to ISS (inside): 1,787 lbs
Hardware transferred to shuttle (outside – OBSS): 536 lbs

Hardware/supplies transferred from ISS (inside): 1,807 lbs
 H2O delivered to ISS: 569 lbs
 O2 used for the 3 EVA's: 92 lbs

• O2 used for "stack maintenance:" 29 lbs

N2 transferred to ISS: 15 lbs

FD12: Undocked at 163:11:41:54Z followed by a fly-around (1/2

Conducted the late inspection of the Shuttle's heat shield using the OBSS. No issues.

FD14: Rudder/Speedbrake thermal spring tab was seen floating away from the vehicle during the FCS checkout. The function of the tab is to prevent a flow path for ascent heating and is not required for entry. The TPS was cleared for entry.

[Post-flight, this issue was presented to 08/07/08 PRCB; decision was made to continue to fly as is. PRCB directed a new ascent thermal environmental assessment to consider flying without the tabs.]

No communications blackout during Entry

| FLT NO. | ORBITER | CREW (6+1 UP/6+1 DN) TITLE, NAMES & EVA'S | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS | SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N. | SRB RSRM AND ET | INC | HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
|--|--|---|--|---|---|--------------------------|-----|-------|------|--|---|
| STS-126/ ISS- ULF2 SEQ FLT # 124 KSC-124 PAD 39A (47) MLP- 3 27 th SHUTTLE FLIGHT TO ISS | OV-105 (Flight 22) ENDEAVOUR OMS PODS: LPO3-33 RPO4-29 FRC5-22 | Note | | CARGO: 39471 LBS PAYLOAD CHARGEABLE: 32403 LBS DEPLOYED: 30432 LBS NON-DEPLOYED: 1760 LBS MIDDECK: 211 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 1487349 LBS NON-DEPLOYED: 1603708 LBS | Brief Mission Summary: "Extreme Home Improvements" STS-126/ULF2 (27th ISS mission) outfitted the ISS to increase accommodations from a crew of three to six. Life support and habitability additions included: an advanced resistive exercise device, a second toilet, a galley, two sleep stations and an integrated water recycling system. The mission also included EVA's for lubricating the sluggish Solar Alpha Rotary Joints (SARJ) and installation of other external systems. Endeavour was originally rolled to Launch Pad 39B as the Launch on Need (LON) vehicle in support of STS-125 HST servicing mission. Last minute complications with HST caused an indefinite delay for STS-125. Endeavour was rolled to Launch Complex 39A and prepared for the STS-126 November launch date. (Shuttles have only moved from one spaceport launch pad to another twice before in the program's history, in 1990 and 1993.) KSC W/D The Orbiter prep days are 162 workdays (W/D) + 3 holidays + 3 weather days in the OPF. VAB ops = 7 W/D + 1 weather day Pad B ops = 19 W/D + 15 contingency days | | | | | | |
| WRS WHO | | MS4 Shane Kimbrough P776/R333/M288 MS5 UP Stay ISS EXP 18/FLT ENG Sandra Magnus Fit 2 (STS-112) P777/R284/V200/F36 MS5 DN EXP 17/Fit ENG Greg Chamitoff (UP ON STS-124, stay ISS) P778/R330/M285 SS EVA 125 DOCKED QUEST EVA 48 EMU/TETHERED EVA 118 SCHEDULED EVA 116 DURATION 6:52 Continued | | Service) & LON V 26 when STS-125 SA. | ehicle on Pads | | | | W-3: | CARGO TOTAL: 3982716 LBS PERFORMANCE MARGINS (LBS): FPR: 2651 FUEL BIAS: 1063 FINAL TDDP: 1682 RECON: 2329 PAYLOADS: PLB: ISS-ULF2 (MPLM, LMC),SSPL/PSSC MIDDECK: ISS-ULF2, MAUI SEITE 5 CRYO TANK SETS RMS (81) SRMS, ODS, OBSS, SSPTS | Total W/D = 206 LAUNCH POSTPONEMENTS - Added STS-126 to FDRD - launch date of 09/18/08 on 08/15/07 Ppd. to 10/16/08 on 02/14/08. Slip due to ECO sensor problems experienced during December launch attempt of STS-122 Ppd. to 11/10/08 on 05/27/08. Slip due to delays in delivery of ET-127 & ET-129 for STS-125 & STS-400, respectively Ppd. to 11/12/08 on 09/08/08. Slip due to Hurricane Faye impacts to HST payload readiness Ppd. to 11/16/08 on 09/24/08. Slip due to STS-125 slip to from 10/10/08 to 10/14/08 caused by Hurricane Ike Launch moved forward to 11/14/08 on 10/19/08. Move due to critical path adjustment. STS-126/ULF2 now "prime crew" as STS-125 postponed to NET Mid-Feb 2009 on 10/02/08. LAUNCH SCRUBS: None. Continued |

ORBIT

INC HA/HP

SRB

RSRM

AND

FT

SSME-TL NOM-ABORT

EMERG

THROTTLE

PROFILE

| | | | | SPACE 3 |
|-----------|---------|---|---|------------------------------------|
| | | CREW | | LANDING SITE/ |
| E1 E | 0001750 | (7) | LAUNCH SITE, | RUNWAY, |
| FLT | ORBITER | (-7 | LIFTOFF TIME, | CROSSRANGE |
| NO. | | TITLE, NAMES | LANDING SITES, ABORT TIMES | LANDING TIMES |
| | | & EVA'S | ABURT TIMES | FLT DURATION, WINDS |
| STS-126/ | | Continued | Continued | Continued |
| ISS- ULF2 | | Continueu | Continueu | Continueu |
| Continued | | SS EVA 126 | TDEL: | DRAG CHUTE |
| | | DOCKED QUEST EVA 49 | 0.000 (P) 0.192 (A) | DEPLOY: |
| | | EMU/TETHERED EVA 119 | | 193 KEAS |
| | | SCHEDULED EVA 117 DURATION 6:45 | MAX Q NAV: 757.6 (P) 750.2 (A) | 335:21:25:12Z |
| | | DUKATION 0:45 | 757.0 (P) 750.2 (A) | NLGTD: 6761 FT |
| | | SS EVA 127 | SRB STG: | 335:21:25:20Z |
| | | DOCKED QUEST EVA 50 | 2:04.32(P) 2:06.24(A) | VEL: 154 KGS |
| | | EMU/TETHERED EVA 120 | | 146 KEAS |
| | | SCHEDULED EVA 118 | <u>Perf</u> : Nominal | HDOT: -6.2 FPS |
| | | DURATION 6:57 | 2 ENC TAL (MDNI). | BRK INIT: 124 KGS |
| | | SS EVA 128 | 2 ENG TAL (MRN): 2:38 (P) 2:39 (A) | DICKTIVIT. 124 KGS |
| | | DOCKED QUEST EVA 51 | 2.50 (1) 2.57 (1) | DRAG CHUTE |
| | | EMU/TETHERED EVA 121 | NEG RETURN: | <u>JETTISON</u> : |
| | | SCHEDULED EVA 119 | 3:52 3:54 | 53 KGS |
| | | DURATION 6:07 | DTA (II/C 1E7 EDC). | 335:21:25:42Z |
| | | | <u>PTA (U/S 157 FPS)</u> : 5:08 5:14 | BRK DECEL FPS2: |
| | | | 3.00 3.14 | AVE 6.2 PK 9.3 |
| | | MCC WHITE FLIGHT FCR | SE TAL (ZZA 104): | WILLEL C CTOD |
| | | (54) | 6:01 6:04 | <u>WHEELS STOP</u> : 335:21:26:02Z |
| | | FLICHT DIDECTORS | DTM /U/C 1/0 EDC). | 11180 FT |
| | | FLIGHT DIRECTORS: SHUTTLE: | PTM (U/S 168 FPS): 6:07 6:18 | |
| | | ASC- Bryan Lunney | 0.07 | ROLLOUT: |
| | | LD/O1- Mike Sarafin | SE PRESS 104 | 9140 FT |
| | | O2- Tony Ceccacci FD 1-12 | 6:54 6:59 | 0:53 M:S |
| | | - Paul Dye FD 13-EOM Planning- Paul Dye FD 1-3 | MEGO OMB | WINDS: |
| | | Kwatsi Alibarufo | MECO CMD: 8:22.1 8:23.0 | 4H KT 0 KTS |
| | | FD 4-EOM | 0.22.1 0.23.0 | OFFICIAL: |
| | | ENT- Bryan Lunney | VI: | 04004P06 KTS |
| | | MOD – John Mccullough Team 4- Richard Jones | 25819.0 25818.8 | 6H 0CROSS KTS |
| | | ream 4- Richard Jones | | DENS ALT: 3234 FT |
| | | ICC | OMS-2: | <u>DENS ALI</u> . 3234111 |
| | | O1 Holly Didings | 38:20 38:19.3 97.4 FPS 95.9 FPS | FLT DURATION: |
| | | O1 – Holly Ridings | 77.1113 70.7113 | 15:20:29:30 |
| | | LD/O2- Ginger Kerrick | | <u>S/T</u> : |
| | | O3 – Brian Smith | | 1183:15:39:46 OV-105: |
| | | Team 4- Courtenary | | 274:03:35:10 |
| | | McMillan | | DISTANCE: |
| | | | | 6,615,109 sm |
| | | | | TOTAL SHUTTLE |

Continued



Parade of storms during STS-125 & STS-126 launch preps as seen on Sep. 04, 2008: Gustav (inland remnants, upper left) followed by Hanna, Ike, & Josephine. (From:Robert Harvey/DA8)



IKE08-notrack.gif: Hurricane IKE tracking. Category 2 landfall at 2:10 a.m. CDT near Galveston Sep. 13, 2008. (From: JSC Roundup Nov. 2008) Damage from hurricanes cost NASA \$50M this season.



DISTANCE:

480.274.259 sm

Continued

PAYLOAD

PAYLOADS/ EXP

WEIGHTS.

FSW

LAUNCH WINDOW:

Total launch window was 9 minutes 26 seconds with window open at 320:00:50:52Z and close at 320:01:00:18Z. Preferred Launch Time was 320:00:55:39 (In-Plane Time) for a launch window of 4m39s.

MISSION HIGHLIGHTS

(LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS,

FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

<u>LAUNCH DELAYS:</u> None. Launch occurred on time at 320:00:55:39Z, 7:55:39 p.m. EST, Friday, November 14, 2008. Weather on launch day was acceptable. Isolated afternoon showers were observed at 60 miles south of KSC along the sea breeze late in the day. The showers diminished by sunset - not a threat for the evening launch time or RTLS.

TAL WEATHER

Weather at the TAL sites was forecast/observed GO.

PERFORMANCE ENHANCEMENTS:

Include the standard set plus: 1) PE Operational High Q TRN/NOV, 2) OMS Assist, 3) a 52 nautical mile MECO, and 4) Del Psi

FLIGHT DURATION CHANGES/LANDING:

- FD 11 MMT decision made for a one-day extension for additional on-orbit time for the Urine Processing Assembly (UPA) troubleshooting & processing or possible Distillate Assembly (DA) return.
- Weather for landing was quite complex. Both KSC and EAFB were activated on Sunday, November 30, 2008, as possible landing sites. A large upper level low pressure system over the eastern US with a cold front moving across FL were concerns for landing at KSC on Sunday (EOM) & Monday (EOM+1). Spaceflight Meteorology Group (SMG) weather forecasts were "NO GO" for KSC with crosswind, ceiling, precipitation, and thunderstorm flight rule violations. Also, two Tornado Watches were issued for central FL and a third Watch included KSC. A squall line moving east at 20 kts combined with an unstable air mass across south and central FL generated numerous thunderstorms and isolated tornadoes by mid day. The weather continued to deteriorate across central FL, prompting the MMT to assess the possibility of staying on orbit and attempting EOM+1 landing at KSC. The SMG forecasts for that day indicated marginal conditions for a safe return to KSC.

After waving off the first opportunity to KSC and with weather conditions deteriorating through the day at KSC, the decision was made to land at EAFB. Weather conditions at EAFB were nearly ideal with light northeast surface winds and mostly clear skies. Endeavour touched down at 335:21:25:09Z (3:25 PM CST, November 30, 2008) on temporary runway 04. This runway was built due to construction and resurfacing of the primary runway.

Continued...

At Left: STS126-S-044 --- NASA Administrator Michael Griffin (front) & Associate Administrator for Space Operations Bill Gerstenmaier watch the launch of the Space Shuttle Endeavour from KSC Launch Control Center on Nov. 14, 2008.

| FLT NO. | ORBITER | | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS | SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N. | RSRM | | RBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ EXP | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
|------------|---------|-----------|---|---|------|--|---------------|-----|---|---|
| STS-126/ | | Continued | U V | Continued | | | | | | |

STS-126/ ISS-ULF2

CAPCOMS:

<u>SHUTTLE</u>

A/E – Alan Poindexter
- Greg (Box)
Johnson (Wx)
LD/01 – Steve Robinson
O2 – Jim Dutton
Planning – Shannon

Lucid Team 4 - N/A

Team 4 - N/A

ISS O1- Terry Virts LD/O2- Mark Vande Hei O3 – Robert Hanley



S126-E-012247 --- Endeavour & Exp 18 crews shared a Thanksgiving meal on middeck: At top Center, Magnus /STSUp/FE Exp18. Clockwise from her: Kimbrough/MS, PLT Boe, Yury Lonchakov/FE Exp 18, Bowen/MS (partially visible behind Lonchakov), Pettit/MSDn, Exp 18 CDR Michael Fincke, Chamitoff/MS, Stefanyshyn-Piper/MS,CDR Ferguson (partially visible top Lt).



- First water regeneration system to recycle urine into drinking water delivered and installed on ISS.

- First flight OI-33 Flight Software. Several minor changes made to improve Post MECO attitude control and reduce the risk of recontact with the ET.

- First flight of new SSME controller S/W to downlink Advanced Health Management System (AHMS) data on-orbit - provides backup to MADS data.

- First flight of redesigned EVA Prime Flight Glove TMG, a Turtleskin® reinforcement layer sandwiched between molded palm and RTV on thumb and index finger and new RTV-3145.

- First flight of ET redesigned LO₂-to-Intertank Flange closeout per RTF B/L Plan

First flight of ATK BSMs in both forward and aft positions.

First Flight of BSM Forward Segment Grain Redesign - eliminated waiver.

- First flight of SRB Installed Enhanced Data Acquisition System (EDAS) Units and Instrumentation.

- First flight of SRB Redesigned Frangible Nut with Pyrotechnic Crossover Assembly to help prevent stud hang-up.

- A Second: "World Toilet Organization (WTO) is a global nonprofit organization committed to improving toilet and sanitation conditions worldwide. World Toilet Day November 19th - During this mission the crew did their bit for WTD with installation of a Tnew second toilet facility on ISS."

NIGHT LAUNCH: #31 NASA Test Director Charlene Blackwell-Thompson, "Endeavour is ready to go. And we're really excited to share our version of a sunrise with you ..."

RENDEZVOUS: #71 Rendezvous and dock with ISS.

EVENTS:

- At L-1 hr NASA Security was informed of an inbound threat to the Shuttle about two miles off shore. Security sweeps came up all clear. At L-5 min officials determined no threat and cleared Shuttle for launch. The perpetrator of the hoax was later arrested, found guilty and sentenced to jail in November 2010.

FD1: OMS2 ignition at 320:01:33:58.3Z resulted in a 125.7 by 84.6 NM orbit.

· FD2: RCC inspection found no areas of concern - focused inspection cancelled on FD4.

- T1 maneuver at 321:19:26:48.0Z resulted in a 192.4 by 184.3 NM orbit

- FD3: R-Bar Pitch Maneuver was performed. No issues.

Docking Contact occurred at 321:22:01:17Z

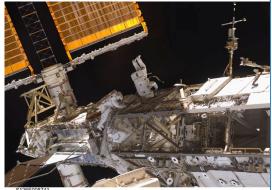
- Hard Dock occurred at 321:22:44:35Z

ISS Hatch opened at 321:24:16:00Z (6:16PM CST, Nov 16, 2008) welcomed by ISS crew.

Continued...



STS126-S-024 --- After STS-126 successful launch Launch Director Mike Leinbach (right) performs tiecutting ceremony on KSC Center Director Bob Cabana in LCC Firing Room. Cabana experienced his first shuttle launch as Center Director.



S126-E-008741 (20 Nov. 2008) --- Stefanyshyn-Piper (left) and Kimbrough during EVA2 continue removing debris and applying lubrication around starboard SARJ.

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | OI | RBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |

STS-126/ ISS-ULF2 Continued



S126-E-008178 (18 Nov. 2008) --- Pettit installs the Water Recovery System (WRS) rack in Destiny lab.



296595main_ED08-0306-131c_946-710.jpg: STS-126 Ferry Flight in route to KSC



Pawel-Warchal-EndISS281108_1227890243.jpg: Impressive photo taken by Polish astronomer just after Shuttle/ISS undocking.

SIGNIFICANT ANOMALIES:

Orbiter:

- -The Fuel Cell 1 S/N P760106 Hydrogen Flowmeter Measurement Began Drifting High And Erratic At 320/12:36 GMT.
- MER-02, LV57 E2 GH2 FCV, After Engine Throttle up E2 GH2 Line Shows a Drop of 200 Psi
- MPS Helium Bottle Lost 140 Psi During Ascent, OMRSD Allows 60 Psi Max. (MER-10)
- GNC Bypass of Ku-Band Radar Data
- Tile Damage on Edge .65l × .23w × .05d
- RDUnassigned Column parity errors on all ME FEPs.
- IRAMS Failed at GMT Rollover.

SRB:

- STS126/Bi136 Squawk 126-001: HDP 3 Blast Container Debris Containment Failure

RSRM, SSME, & ET: None.

MOD:

- Updating Minimum EPS Consumables
- Loss of Crewlock Bag during Eva #1
- Over Torque of Trundle Bearing Assembly Mount
- Middeck Return Item Weights Missing
- Debris Released Near the LH2 T-0 Plate Integration:

- SM GPC Failure to Send GCIL Commands

- Unexpected Debris/Expected Debris Exceeding Mass Allowable Prior to Pad Clearance (Liftoff Debris)

EVENTS: Continued...

- IELK Seat Liner Transfer at 322:02:50:00Z (8:50 PM CST, Nov 16, 2008). At that time Greg Chamitoff became a member of STS-126 and Sandra Magnus joined the ISS Expedition 18 as Flight Engineer
- FD5: Based on review of launch imagery, the MMT decided that the focused inspection of the Orbiter heat shield was not required.
- -FD5: EVA 1: Piper & Bowen transferred the Nitrogen Tank Assembly (NTA) from the External Stowage Platform (ESP)-3 to Lightweight MPESS Carrier (LMC), followed by the Flex Hose Rotary Coupler (FHRC) transfer from LMC to ESP-3. JEM EFBM Multi-Layered Insulation (MLI) Cover was removed in prep for c/o of EFBM (to be installed on 2JA later in 2009). Stbd SARJ trundle bearing assembly (TBA) #10 and #6 were replaced, and the stbd race ring was partially cleaned and lubed. A crew equipment bag was inadvertently released during the EVA, but there was sufficient redundant cleaning and lube equipment to finish scheduled tasks. EVA 1 duration
- FD6: Home improvements continued aboard ISS with installation of two new
- bedrooms and preparations to activate the water recycling facility.

 -FD7: EVA2: Piper & Kimbrough relocated the CETA carts in prep for 15A install of S6 solar array upcoming in Feb. 2009; SSRMS Latching End Effector (LEE) A snares were lubricated; all stbd SARJ cleaning and lube objectives were completed except for cleaning under covers 11 and 12; & 4 more trundle bearing assemblies were replaced. EVA was terminated slightly early due to high CO2 readings in Kimbrough's' suit. EVA2 duration 6:45. [During this EVA the ISS marked the 10th Anniversary of launching its first element the Russian-built Zarya control module. "It's hard to believe it's been 10 years," said Kirk Shireman, MASA's Deputy Manager for ISS who remembers it being a cold Shireman, NASA's Deputy Manager for ISS, who remembers it being a cold
- day on the steppes of Kazakhstan.]
 FD9: UPA anomalous shutdown due to centrifuge speed below limits & high motor
- FD9: EVA3: Piper & Bowen continued cleaning of ISS stbd SARJ; R&R'ed the remaining TBA; and cleaned area around SARJ's drive lock assemblies. EVA3 duration 6:57.
- dutation 13:77.

 FD11:EVA4: Bowen & Kimbrough completed stbd and port SARJ lube tasks; P1 lower inboard camera installed in camera port 7; external facility berthing mechanism latch bolt retracted via EVA override and cover reinstalled; JEM GPS A installed and heaters checked out ok, JEM GPS B deferred to stage or next flight; and, no get-ahead radiator imagery was taken. EVA4 duration 6:07.
- SARJ put back in autotrack at 330/00:35 GMT (post-EVA).
- FD12: UPA processing was completed for the docked mission.

Transfers:

- 16,390 lbs of hardware transferred to ISS (Leonardo & middeck)
- 3,642 lbs of hardware returned from ISS to Endeavour (inside)
- 25 lbs O2 transferred to ISS
- FD15: Undocked at 333:14:47:26Z followed by Sep-1, Sep-2 and Sep-3; OBSS surveys on starboard, nose cap and port; and LDRI downlink.
- Communications blackout during Entry: "There [were] a few drop outs but nothing big around GMT 335:21:09 d:h:m."

| | | | | LANDING SITE/ | SSME-TL | | | | | | |
|---|-------------|---|---|---------------------------------|------------------------------|---------------------------|------|-----------------------------------|-------|--------------------------------------|--|
| | | CREW (6+1 UP/6+1 DN) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (0+1 UP/0+1 DIN) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, WINDS | PROFILE ENG. S.N. | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-119/ | OV-103 | CDR: | KSC 39A | KSC 15 (KSC 70) | 104/104/ | BI-135 | 51.6 | DIRECT | OI-33 | CARGO: | Brief Mission Summary: ISS United States Operational |
| ISS- 15A | (Flight 36) | Lee Archambault | 074:23:43:44Z | 087:19:13:26Z | 109% | | (28) | INSERTION | (2) | 39088 LBS | Segment (USOS) assembly was completed with installation of |
| 050 | DISCOVERY | Flt 2 (STS-117) | 7:43:44 PM EDT (P) | 2:13:26PM CDT | DDEDIATED | RSRM | | POST OMS-2: | | DAV# 04B | S6 truss with final set of power generating Solar Arrays on |
| SEQ FLT # 125 | | P779/R307/V201/M265 | 7:43:44 PM EDT (A) Sunday (12) | Saturday (23) 03/28/09 (10) | PREDICTED: 100/104.5/ | 103 | | 126.0x84.9 NM | | <u>PAYLOAD</u> CHARGEABLE: | Shuttle's 28th ISS Mission. This additional power prepares the ISS with the capability of housing six member crews in the |
| I L I # 125 | OMS PODS | <u>PLT</u> | 03/15/09 (10) | 03/20/09 (10) | 104.5/72/104.5 | FT-127 | | DEORBIT: | | 32546 LBS | near future. |
| KSC-125 | LPO1-39 | Tony Antonelli | | DEORBIT BURN: | | | | HA 184.8 NM HP 21.6 NM | | | |
| | RPO3-37 | P780/R334/M289 | LAUNCH WINDOW: | 087:18:08:14Z | ACTUAL: | SLWT- 33 | | | | DEPLOYED: | KSC W/D: OPF = 191+13H+3Wx, VAB = 6 + 0C, PAD = 47 + |
| PAD 39A (48) | FRC3-36 | <u>MS1</u> | 4M 14S (PLT in-plane) | <u>XRANGE</u> : 222.2 NM | 100/104.5/ 104.5/72/104.5 | | | <u>ENTRY</u> <u>VELOCITY</u> : | | 32489 LBS | 14C: Total Work Days = 244 (OPF Processing occurred over a total time period of 207 days.) |
| (40) | | Joseph Acaba | | ARAINGE. 222.2 INIVI | 104.3/72/104.3 | | | 25849 FPS | | NON-DEPLOYED: | total time period of 207 days.) |
| MLP-1 | | P781/R335//M290 | EOM PLS: KSC | ORBIT DIR: A/R (14) | 1 = 2048 (9) | | | ENTRY | | 0 LBS | LAUNCH POSTPONEMENTS |
| | | | <u>TAL</u> : ZZA <u>TAL WX</u> : MRN | | 2 = 2051 (8) | | | RANGE: 4377 NM | | | - Added STS-119 to FDRD - launch date of 01/15/04 on 01/23/03 |
| 28 th SHUTTLE | | MS2 Steve Swanson | TAL WA. WIKI | AIM PT: Close-In | 3 = 2058 (3) | | | 43// NM | | MIDDECK: 57 LBS | - Ppd. to NET 06/10/04 on 03/13/03 due to Columbia accident. - Ppd. to NET 06/30/04 on 04/17/03 due to Columbia accident. |
| FLIGHT | | Flt 2 (STS-117) | SELECTED: | MLGTD: 2705 FT | | | | 1 | | 137 LB3 | - Ppd. to NET 00/30/04 on 04/17/03 due to Columbia accident Deleted from FDRD on 05/28/03 pending Columbia accident |
| TO ISS | | P782/R308/V202/M266 | RTLS: KSC15 CI/NOM | 087:19:13:26Z | | | | | | <u>SHUTTLE</u> | investigation outcome. |
| | | | TAL: ZZA30L N/N AOA: KSC15 CI/N | VEL: 188 KGS | | | | - | | <u>ACCUMULATED</u> | - Re-Baselined in FDRD - Launch date of 11/06/08 on 10/04/07 |
| 112 | | MS3 Richard Arnold | 1ST DAY PLS: EDW22 | 203 KEAS HDOT: -2.7 FPS | | | | | | <u>WEIGHTS:</u> <u>DEPLOYED</u> : | - Ppd. to 12/04/08 on 02/14/08. Slip due to ECO Sensor problems during STS-122 launch attempt. |
| ARC ARC | HAMBAULT | P783/R336/M291 | N/N | прот2.7 гРЗ | | 17 | | | | 1517781 LBS | - Ppd. to 02/12/09 on 07/03/08. Slip due to ET delivery schedule. |
| 150 | | | TDEL | TD NORM 195: | | 1 | 1 | - | | 1017701 250 | - Ppd. to NET 02/19/09 on 02/04/09. Slip due to additional testing |
| | | <u>MS4</u> | <u>TDEL</u> : 0.000 (P) -0.008 (A) | 3473 FT | | | | - 37 | | NON-DEPLOYED: | & analysis required to resolve MPS flow control valve issue |
| | 119 | John Phillips Flt 2 (STS-100) | 0.000 (1) -0.000 (A) | DRAG CHUTE | 100 | | | | | 1603765 LBS | - Ppd. to NET 02/22/09 on 02/09/09. Slip due to additional testing & analysis required to resolve MPS flow control valve issue |
| SWANSON | ACABA | P784/R266/V203/M232 | MAX Q NAV: | DEPLOY: 194 KEAS | 10 | AND THE PARTY OF | 7-1 | 1000 | | CARGO TOTAL: | - Ppd. to 02/27/09 on 02/14/09. Slip due to additional testing & |
| 2 | MAKATA | . 70 WYLEGGY VEGGYMEGE | 739.4 (P) 722.9 (A) | 087:19:13:29Z | | | | | | 4021804 LBS | analysis required to resolve MPS flow control valve issue |
| | | MS5 UP Stay ISS | SRB STG: | 0.75 | | | | | | | - Ppd. to TBD at STS-119 "Continuation" FRR on 02/20/09. |
| | | EXP 18FLT ENG Koichi Wakata (JAXA) | 2:04.00 (P) 2:05.12 (A) | NLGTD: 5369 FT 087:19:13:34Z | STS-11 | | | | | PERFORMANCE MARGINS (LBS): | Managers could not reach a consensus Ppd. to tentative date of 03/12/09 on 02/25/09. MPS flow control |
| | | Flt 3 (STS-72, STS-92) | | VEL: 152 KGS | | | | onstellation | | FPR: 2651 | valve U/R. |
| MOB AC | HAMITOPF | P785/R208/V164/M181 | <u>PERF</u> : NOMINAL | 167 KEAS | | | | sident directed on in 2010.) | t | FUEL BIAS: 1063 | - Launch date set for NET 03/11/09 on 03/04/09. MPS flow control |
| | N Really | | 2 ENG TAL (MRN): | HDOT: -6.7 FPS | 317861ma | in image | 1301 | 946- | | FINAL TDDP: 1746 | valve U/R. |
| w 477 | | MS5 DN EXP 18/FIt ENG Sandra Magnus | 2:35 (P) 2:37 (A) | BRK INIT: 40 KGS | 710STS11 | 9Moon.jpg | g : | | | RECON:2016 | - Launch date set for 03/11/09 at Delta FRR on 03/06/09. - Officially ppd. launch to 03/15/09 on 03/12/09 after Scrub on |
| 4 / | Mar. | Flt 2 (STS-112) | NEG RETURN: | DAKTIVIT. TO KOO | 140 5014 | ET | | | | PAYLOADS: | 03/11/09. Scrub was due to gaseous hydrogen leak in vent line. |
| N. | | (UP ON STS-126, stay ISS) | 3:54 3:55 | DRAG CHUTE | M 3 EOM: WEIGHT: | IMPACT | | | | PLB: | The second secon |
| | | P786/R284/V200/F36 | | <u>JETTISON</u> : 60 KGS | 201795 LBS | 1:14:30 | | | | ISS 15A (S6) | LAUNCH SCRUB: |
| | | SS EVA 129 | PTA (U/S 166 FPS): | 087:19:13:59Z | X CG: | MET | | | | MIDDECK: | Mar.11, 2009, Wednesday, with fewer than 20 minutes left in tanking process launch was scrubbed due to a gaseous hydrogen |
| | | DOCKED QUEST EVA 52 | 5:12 5:15 | BRK DECEL FPS2: | 1082.8 IN | LAT: | | | | ISS 15A, MAUI | vent line leak. This line connects the Ground Umbilical Carrier |
| | | EMU/TETHERED EVA 122 | JE THE (EEN TOT). | AVE 3.1 PK 4.2 | <u>LANDING</u> : | 35.725 S | | | | | Plate (GUCP), attached to ET, to the "flare stack" for burn-off of |
| | | SCHEDULED EVA 120 DURATION 6:07 | 6:00 6:00 | WHEELS STOP: | LANDING. | | | | | E ODVO TANK | vented gaseous hydrogen. Launched scrubbed at 1:37 PM CDT. |
| | M. M. | DUKATION 0.07 | PTM (U/S 181 FPS): | 87:19:14:43Z | WEIGHT: | <u>LONG</u> : 157.56 W | | | | 5 CRYO TANK SETS | Technical Scrub. |
| N. X | W/6/ | SS EVA 130 | 6:13 6:16 | 12050 FT | 201713 LBS | 137.30 44 | | | | 3213 | LAUNCH WINDOW: |
| N. S. | | DOCKED QUEST EVA 53 | CE DDECC 104 | ROLLOUT: | X CG: | | | | | RMS (82) | Total launch window was 8M 27S with window open at |
| | y / | EMU/TETHERED EVA 123 SCHEDULED EVA 121 | <u>SE PRESS 104</u> 6:56 6:57 | 10345 FT 1:17 M:S | 1084.7 IN | | | | | 00110 000 | 074:23:39:31Z and close at 074:23:47:58Z. Preferred Launch Time was 074:23:43:44Z (In-Plane Time) for a launch window of |
| | * | DURATION 6:30 | | | | | | | | SRMS, ODS, | 4M 14S. |
| | | Continued | Continued | Continued | | | | | | 0000, 00F 10 | Continued |
| | | | Continued | Continued | | | | | | OBSS, SSPTS | |

| FLT NO. | ORBITER | CREW (7) TITLE, NAMES & EVA'S | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS | SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N. | SRB RSRM AND ET | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
|------------|---------|--|--|---|---|--------------------------|-----|----------------|-----|---|--|
| CTC_110/ | | | | | | | | | | | Continued |

STS-119/ ISS-15A Continued



Continued... WINDS: SS EVA 131 15H KT 0.3L MECO CMD: DOCKED QUEST EVA 54 KTS 8:23.6 8:23.8 EMU/TETHERED EVA 124 OFFICIAL: SCHEDULED EVA 122 15017P23 KTS DURATION 6:27 X1P1H17P23 KTS 25819.0 25819.6 MCC WHITE FCR (55) DENS ALT: 1718 FT FLIGHT DIRECTORS: OMS-2: SHUTTLE: 38:00 38:30.0 FLT DURATION: 97.7 FPS 96.1 FPS ASC/ENT- Richard Jones 12:19:29:42 LD/O1- Paul Dve O2- Mike Sarafin 1196:11:09:28 (FD1- FD12) O2-Tony Ceccacci OV-103: 318:03:39:51 (FD13-EOM) O3- Richard LaBrode (Prelaunch - FD1) DISTANCE: O3- Norman Knight 5.304.106 sm (FD2-FD8 O3- Bryan Lunney

TOTAL SHUTTLE

485.578,259 sm

DISTANCE:

Continued...

(FD9-EOM)

Continued...

Planning- Norm Knight

MOD – John Mccullouah Team 4 - Tony Ceccacci

- Bryan Lunney

ABOVE: STS-119 launch panorama into twilit sky. Photo by Ryan R. Smith (KSC-BOE-K2)

http://www.ryansmithphotography.com/

BELOW: S119-E-007747 --- STS-119 & Exp18 crews in ISS Harmony, From left (bottom row): PLT Antonelli, CDR Archambault, & Acaba/MS. From left (middle row): Magnus/MS, Exp 18 CDR Michael Fincke, Yury Lonchakov/Exp18FE(RSA), & Koichi Wakata/Exp18FE (JAXA). From left (top row) Swanson/MS, Arnold/MS, & Phillips/MS.



LAUNCH DELAYS: None. Launch occurred on time at 074:23:43:44Z, 7:43:44 p.m. EST, Sunday, March 15, 2009. Launch weather was relatively benign at KSC. A sea breeze developed at KSC and moved west of the Banana River about 3 hours prior to launch. The movement of the sea breeze inland produced favorable weather conditions with widely scattered clouds.

TAL WEATHER

TAL sites at both Zaragoza and Moron, Spain were acceptable for launch due to a high pressure system. Winds at Istres were out of limits following the passage of a cold front the day prior to launch, but launch proceeded with two acceptable TAL sites.

PERFORMANCE ENHANCEMENTS:

Include the standard set plus: 1) PE Operational High Q WIN/MAR, 2) OMS Assist, 3) 52 nautical mile MECO, & 4) Del Psi

FLIGHT DURATION CHANGES/LANDING

- When STS-119 launch was slipped to March 15, 2009, (due to earlier scrub) the mission duration was reduced from 14 to 13 days to accommodate a Russian Soyuz mission to ISS later in the month. This also reduced number of EVA's from 4 to 3.
- For first KSC landing opportunity weather was no go with cloud decks building in at lower than anticipated broken (5/8) at 3000. Weather improved as did the wind direction. Discovery was given 'Go" to land on second KSC opportunity. Landing occurred at 087:19:13:26Z (2:13:26 PM CDT Saturday, 03/28/09).

FIRSTS/SECONDS/LASTS:

- SSME ECP 1514 LPOTP Bearing Ball Process Change
- SRB Hold Down Post Debris Containment mod
- S&MA: Orbiter LH₂ T-0 Umbilical Ice: Update to IDBR-01 and NSTS-60559 to reflect new expected debris source.
- Last to be installed on ISS, the 45-foot S6 aluminum girder weighing more than 31,000 pounds was the first truss segment built (stored at KSC for six years).
- Second time a bat attempted to fly into space on Space Shuttle ET; coincidentally Koichi Wakata was on both flights.
- Discovery served as a hypersonic test bed during entry for new heat shield tiles in development for NASA's next-generation spacecraft.

| FLT NO. | ORBITER | CREW (7) TITLE, NAMES & EVA'S | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS | SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N. | SRB RSRM AND ET | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
|-----------------------------------|---------|---|--|---|---|--------------------------|-----|----------------|-----|---|--|
| STS-119/ ISS- 15A Continued | | Continued ISS LD/O1 - Kwatsi Alibaruho O2 - Heather Ranick O3 - David Korth Team 4 - Robert dempsey CAPCOMS: SHUTTLE A/E - George Zamka Asc (Wx)- C. Hobaugh Ent (Wx)- Al Poindexter LD/O1 - George Zamka O2 - Greg (Box) Johnson | | | | | | | a | | Continued FIRSTS/SECONDS/LASTS: - March 27, 2009: In a rare example of overlapping space missions, a U.S. space shuttle [STS-119] is set to return to on Saturday just a few hours after a Russian Soyuz arrives ISS. Together the crews of the three craft total 13 people, record for humans in space, first set 14 years ago this mor [Robert Pearlman - collectSPACE.com] MCC ROSES: This was the 100th flight since the Challenger accident that beautiful bouquet of roses was delivered to the Houston M celebrate each mission since the landing of STS-26 in 198 1989 it was determined that the roses were sent by the Sh family (Mark, MacKenzie & Terry) of Bedford, TX. On Mar 2009, the Sheltons personally delivered their 100th bouque |

S119-E-006673 --- Swanson (center) and Arnold (partially obscured above Swanson) during EVA 1 connected bolts to attach S6 truss to S5. plugged in power and data connectors, prepared a radiator for cooling, and readied new solar arrays.

Team 4 - N/A S119-E-009765 (25 March 2009) --- ISS USOS assembly complete as seen during Shuttle fly-around [labeled the "\$100 Billion Picture" by ISS Lead Flight Director Kwatsi Alibaruho]. The

Planning – Shannon Lucid

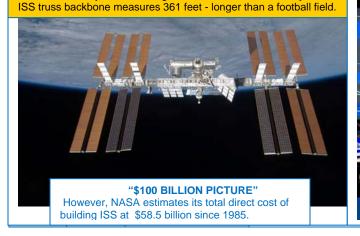
Team 4 - N/A

LD/O1 – Rick Davis

O3 – Jay Marschke

O2- Lucia McCullough

ISS





IRSTS/SECONDS/LASTS:

09: In a rare example of overlapping space S. space shuttle [STS-119] is set to return to Earth st a few hours after a Russian Soyuz arrives at the the crews of the three craft total 13 people, tying the ans in space, first set 14 years ago this month. an - collectSPACE.com

00th flight since the Challenger accident that a uet of roses was delivered to the Houston MOCR to mission since the landing of STS-26 in 1988. In termined that the roses were sent by the Shelton lacKenzie & Terry) of Bedford, TX. On March 27, 2009, the Sheltons personally delivered their 100th bouquet in recognition of STS-119. They received a warm welcome in the MOCR, led by James "Milt" Heflin, JSC Associate Director, Technical. They also received several JSC mementos for their kindness and dedication to the Space Program.

NIGHT LAUNCH: # 32 (Into twilit sky)

RENDEZVOUS: #72 Rendezvous and dock with ISS.

EVENTS:

- FD1: OMS2 ignition at 075:00:22:14Z resulted in a 126.0 by 84.9
- FD2: RCC inspection found no areas of concern
- T1 maneuver at 076:18:35:39.0Z resulted in a 196.8 by 183.3
- FD3: R-Bar Pitch Maneuver was performed. No issues.
- Docking Contact occurred at 076:21:19:49Z, St. Patrick's Day
- Hard Dock, hooks closed, occurred at 076:21:33:59Z
- ISS Hatch opened at 076:23:22:59Z (6:09 PM CDT, March17, 2009) welcomed by ISS crew.
- IELK Seat Liner Transfer at 077:02:00Z (9:00 PM CDT) March 17, 2009). At that time Sandra Magnus became a member of STS-119 and Koichi Wakata joined the ISS Expedition 18 as Flight Engineer.
- FD5: Based on review of launch imagery, MMT cancelled FD6 focused inspection of Orbiter heat shield.
- FD5: EVA 1: Steve Swanson & Ricky Arnold: Activities included: S6 Connected to ISS, SABB Unstow, PCDF-PU Transfer, PVR Deploy, and 1B & 3B solar arrays deployed EVA1 duration 6:07.

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|-------------------------|-------------------------------|--|--------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, | THROTTLE PROFILE FNG S N | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |

STS-119/ ISS- 15A Continued ...



JSC2009-E-060960 (20 March 2009) --- Group portrait of Shuttle STS-119 Orbit 1 Flight Control Team in JSC MCC. FD Paul Dye (left) is visible on the front row.



JSC2009-E-060959 (20 March 2009) --- Group portrait of STS-119/15A ISS Orbit 1 Flight Control Team in JSC MCC. FD Kwatsi Alibaruho (right) is visible on the front row.



In JSC MCC at Landing Support Officer (LSO) console: On left, Marty Linde/USA, Lt. Col. Dave Impiccini/USAF (standing), Wayne Hensley/USA (on phone), & Brenton Hartung (student observer in rear). Laughter caused by photographer always catching Wayne on telephone.

Continued... SIGNIFICANT ANOMALIES:

- Ground Imagery Showed That When Thruster F4D's Tyvek Rain Cover Released at 5:28 Sec Met (\sim 93fps Or 63 Mph), A \sim 21 Inches \times \sim 7.4 Inches Piece Remained Attached to the Thruster Lip as Shown In Figures 1 and 2.
- KSC:
- STS-119 Post Launch Debris SRB: RSRM: SSME: None.

FT:

-During Initial Launch Attempt of STS-117/Et-127, a GH₂ Leak was Detected at Approximately One Minute After Start of LH₂ Topping

MOD:

- -Inadvertent Abort Light Command Sent from FDO Integration:
- -Unexpected Debris/Expected Debris Exceeding Mass Allowable Prior to Pad Clearance (Liftoff Debris)
- -High GH_2 Concentrations at the Ground Umbilical Carrier Plate (GUCP
- -MPS LH₂ ORB Umbilical Plate Gap Pressure LCC Violation -Stub Tile Damage

Continued... EVENTS:

Downlinked, P3 UCCAS Deploy unsuccessful, temporary tethers installed, S3 PAS Deploy deferred to EVA3, and Z1 Patch Panel Reconfig unsuccessful. EVA2 duration 6:30.

- FD8: CDR Lee Archambault maneuvered the Shuttle-ISS "stack" to avoid a 9-year-old piece of Chinese space junk (4" fragment) that could have been a close encounter during upcoming EVA3. (A 4' fragment from a Russian satellite had previously passed at a safe distance prior to Shuttle/ISS docking.)
- FD9: EVA3: Joe Acaba & Ricky Arnold: Activities included: UCCAS troubleshooting; tethered in place, CETA cart relocation and SSRMS LEE B lube completed. Numerous get aheads accomplished: CETA coupler, S1/S3 SSAS panel BBC reconfig, S1 FHRC outboard p-clamps released 2 of 6 (#5, #6), and retrieved bungee caddy from Nadir STBD A/L toolbox. EVA3 duration 6:27.
- Transfers:
- 32,962 lbs of hardware transferred to ISS (S6 Truss & Middeck)
- 1963 lbs of hardware returned from ISS to Discovery (middeck)
- 1142 lbs of water transferred to ISS
- FD11: Undocked at 084:19:53:26Z
- Flyaround initiated 084: 20:197
- Communications blackout during Entry occurred at GMT 87:18:47 to 87:18:52 d:h:m due to plasma effect.

SIGNIFICANT ANOMALIES:

Orbiter:

- Galley Water Leakage.
- WLES Group 2 Sensor S/N# 1033 Time Slip
- During MM/OD Monitoring With Group 2 Sensors, Sensor S/N 1024 On The Port Wing Unexpectedly Dropped Out Of On-Orbit Mode After 5-6 Hrs Of Monitoring.
- AVIU S/N 1031 Failure
- Failed Camera Shutter Actuation.
- Incorrect SORG Needle Installed
- V07P9379A Dropped To Lower Limit (Unit Step) During STS-119 Ascent
- Aft Stub Tile on the Upper Body Flap Was Suspect to be Damaged During FD3 On-Orbit Inspection. During Post-Flight Inspection the V070-395018-144 Tile Was Verified As Damaged.

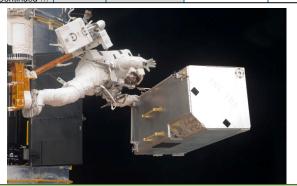
Continued at left...

| FLT ORBITER CREW LAUNCH SITE, LIFTOFF TIME, CROSSRANGE CROSS | | | | | LANDING SITE/ | SSME-TL | | | | | | |
|--|-------------|---------------|---------------------|-----------------------|---------------------|-------------------|------------------------|-----------|--|----------|--------------------|--|
| The continued | | | | LAUNCH SITE, | | | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| STS-125 Visign 20 Clark Annual Process FIT DIBARTON, PROFER FT WINDS PROFESS FT W | FLT | ORBITER | (1) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| STS-125 ON-164 City Ci | NO. | | TITLE NAMES | | | | | INC | HA/HP | | | |
| Spin Amang Spin | | | | ABORT TIMES | | | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STATE Continued Continue | STS-125 | | CDR: | KSC 39A | EDW22 CONC | 104/104/109% | BI-137 | | | | CARGO: | |
| SEC PAT 13 | | | | | | | | (51) | INSERTION | (5) | 32418 LBS | |
| P3 P3 P3 P3 P3 P3 P3 P3 | | ATLANTIS | | | | | DODIA | | | | DAVUGAD | |
| March Continued Continue | | | | \ / | | | | | | | | |
| PLT | FLT # 126 | OMS PODS | P787/R237/V101/W2U7 | | | 72/104.5 | 105 | | | | | |
| PRO1-37 PRO1-37 PRO3-37M-92 SWM 45S (Total) 5WM 45S (Tot | VCC 124 | | PI T | 03/11/07 (0) | 03/24/07 (11) | ACTUAL: | FT-130 | | X 106.8 NM | | 22234 LD3 | |
| PAB 9733 M/992 FRC 4-30 P/86 K1337M/992 FRC 4-30 MSI M | K3C-120 | | Gregory C. Johnson | LAUNCH WINDOW: | DEORBIT BURN: | | 2 | | | | DEPLOYED: | |
| MS1 Michael Good | PAD 39A | FRC4-30 | | 59M 45S (Total) | 144:14:24:41.0Z | 72/104.5 | SLWT | | | | 4694 LBS | definiton view of the universe and HST life extension into the |
| Military | | | | 41M 50S (Preferred) | | | 34 | | | | | |
| MLP-2 P799/R338/M2/93 TAL - MRN TAL WS None. TAL - WRN TAL WS None. TAL - WRN TAL - WS None. TAL - WS None. | , , | | | EOM PLS: KSC | XRANGE: 405.6 NM | | | | | | | |
| MS2 Megan McAuthur P79/0R339/F46 RTLS KSC15 NN ADA KSC15 | | | | | ODDIT DID: D/I | | СТ | | | | 17560 LBS | |
| MS2 MS2 MS2 MS2 MS3 MS4 MS4 MS4 MS5 | MLP-2 | | F/09/K330//WZ93 | | | 3 = 2037 (4) | | | HP 26.4 NM | | MIDDECK. | |
| Megan McAultur Profit Service Prof | STH & Final | | MS2 | TAL WX. NOIC. | (00) | M 3 EOM: | | | FNITDV | | | propared for the met decizionality opportunity. |
| Flight P790R339/I-46 RILS_KSC15 NN TAL_MRN2 CUN ADA KSC15 NN TAL_MRN2 CUN TAL_MRN2 | | | | SELECTED: | AIM PT: Nominal | WEIGHT: | MET | | | | | |
| MS3 AOA; KSC15 NN To DAY PLS; NOR17 VEL. 192 KGS LONG FIRSTS-67, STS-81, STS-103, STS-109 P79fR197lv133M167 To EL: 0000 (P) - 0.448 (A) Continued To DAY PLS; NOR17 VEL. 192 KGS LONG L | | | P790/R339/F46 | | | | | | | | | |
| Total Work Days = 396 (OPF Processing occurred over a total time period of 314 days.) Total Work Days = 396 (OPF Processing occurred over a total time period of 314 days.) | | | 1400 | | | | | | | | | |
| Continued Cont | | | | AOA: KSC15 N/N | | 1078.3 IN | 16.699 IV | | ENTRY | | | |
| NON-DEPLOYED 147.375 W 1 | | | | | 200 KEAS | I ANDING: | I ONG: | | 4267 NM | | | |
| P791/R191/V133/M167 TDEL: 0.000 (P) - 0.448 (A) Continued 225898 BBS X CG: 1080.9 IN 1021371 LBS CARGO TOTAL: 4054222 LBS Mike Massimino (Ft2 - STS-109) P792/R275/V204/M241 SRB STG: 2.04.16(P) 2.04.32(A) PERF: NOMINAL 25 KV A 132 EMU/TETHERED EVA 125 CSCHEDULED EVA 123 DURATION 7.256 EMU/TETHERED EVA 125 CSCHEDULED EVA 124 DURATION 7.56 PTM (JIS 500 FPS): 5.09 (P) 5.12 (A) Continued Continu | | | | IN/IN | | | 147.375 W | | 1207 14111 | | 102 1102 250 | , , , |
| MS4 Mike Massimino (Fit 2 - STS-109) P792/R275/V204/M241 MS5 Andrew Feuslel P793/R340/M294 MS6 P793/R340/M294 PERF: NOMINAL 2 ENG TAL (MRN): 2-248 (P) 2-255 (A) EMU/TETHERED EVA 125 SCHEDULED EVA 125 SCHEDULED EVA 125 SCHEDULED EVA 126 SCHEDUL | | | | | | | | | | | | |
| Mike Massimino (Fit2 - STS-109) P792/R275/V204/M241 MS5 Andrew Feustel P793/R340/M294 MS5 EMU/TETHERED EVA 125 SCHEDULED EVA 123 DURATION 7:20 SS EVA 133 EMU/TETHERED EVA 126 SCHEDULED EVA 126 DURATION 7:56 Continued MAX Q NAV: 740.95 (P) 734.75 (A) SRB STG: 2:04.16(P) 2:04.32(A) PERF: NOMINAL 2 ENG TAL (MRN): 2:48 (P) 2:55 (A) EMU/TETHERED EVA 125 DURATION 7:56 Continued MAX Q NAV: 740.95 (P) 734.75 (A) SRB STG: 2:04.16(P) 2:04.32(A) PERF: NOMINAL 2 ENG TAL (MRN): 2:48 (P) 2:55 (A) EMU/TETHERED EVA 125 DURATION 7:56 Continued MIDDECK: HST SM4, ICBC 30 MIDDECK: HST SM4 Continued Ppd. to 10/14/08 on 09/24/08. Slip due to Hurricane Ike Ppd. to 10/14/08 on 09/24/08. Slip due to training time lost in the aftermath of Hurricane Ike Ppd. to 10/14/08 on 09/24/08. Slip due to training time lost in the aftermath of Hurricane Ike Ppd. to NET Mid-Feb 2009 on 10/02/08. Slip due to training time lost in the aftermath of Hurricane Ike Ppd. to NET Mid-Feb 2009 on 10/02/08. Slip due to training time lost in the aftermath of Hurricane Ike Ppd. to NET Mid-Feb 2009 on 10/02/08. Slip due to textraining time lost in the aftermath of Hurricane Ike Ppd. to NET Mid-May 2009 on 10/03/08. Slip due to textraining time lost in the aftermath of Hurricane Ike Ppd. to NET Mid-May 2009 on 10/03/08. Slip due to textraining time lost in the aftermath of Hurricane Ike Ppd. to NET Mid-May 2009 on 10/03/08. Slip due to textraining time lost in the aftermath of Hurricane Ike Ppd. to NET Mid-May 2009 on 10/03/08. Slip due to textraining time lost in the aftermath of Hurricane Ike Ppd. to NET Mid-May 2009 on 10/03/08. Slip due to textraining time lost in the aftermath of Hurricane Ike Ppd. to NET Mid-May 2009 on 10/03/08. Slip due to textraining time lost in the aftermath of Hurricane Ike Ppd. to NET Mid-May 2009 on 10/03/08. Slip due to textraining time lost in the aftermath of Hurricane Ike Ppd. to NET Mid-May 2009 on 10/03/08. Slip due to textraining time lost in the aftermath of Hurricane | | | | 0.000 (P) -0.448 (A) | Continued | | | | | | 1621371 LBS | |
| Fig. 2 - STS-109) P792/R275/V204/M241 SRB STG: 2:04.16(P) 2:04.32(A) Andrew Feustel P793/R340/M294 PERF: NOMINAL 2 ENG TAL (MRN): 2:48 (P) 2:55 (A) BURATION 7:20 SS EVA 133 EMUTETHERED EVA 125 SCHEDULED EVA 124 DURATION 7:56 Contlinued PTA (U/S 483 FPS): 4054222 LBS RAG(INS (LBS): FPR: 2651 FPR: | | | | | | 1080.9 IN | | | | | CARCO TOTAL: | |
| P792/R275/V204/M241 MS5 Andrew Feustel P793/R340/M294 PERF: NOMINAL 2 ENG TAL (MRN): 2.48 (P) 2.55 (A) EMU/TETHERED EVA 125 SCHEDULED EVA 123 DURATION 7:20 SS EVA 133 EMU/TETHERED EVA 126 SCHEDULED EVA 124 DURATION 7:56 Continued PTA (U/S 483 FPS): 4:11 (P) 4:12 (A) Continued PTA (U/S 500 FPS): 5:09 (P) 5:12 (A) Continued Continued PRES: NOMINAL 2 ENG TAL (MRN): 2.48 (P) 2.55 (A) EMER: NOMINAL 2 ENG TAL (MRN): 2.48 (P) 2.55 (A) EMU/TETHERED EVA 125 SCHEDULED EVA 123 DURATION 7:56 Continued PTA (U/S 483 FPS): 4:11 (P) 4:12 (A) Continued EMU/TETHERED EVA 126 SCHEDULED EVA 124 DURATION 7:56 Continued EMU/TETHERED EVA 126 SCHEDULED EVA 124 DURATION 7:56 Continued EMU/TETHERED EVA 126 SCHEDULED EVA 126 SCHE | | 4 | | | | | - | - | | A | | sensor problems experienced during December |
| SRB STG: 2:04.16(P) 2:04.32(A) PERE: NOMINAL PERE: NOMINAL SE VA 132 EMU/TETHERED EVA 125 DURATION 7:20 SEVA 133 EMU/TETHERED EVA 126 Contlinued SE VA 134 DURATION 7:56 Contlinued SSE VA 135 EMU/TETHERED EVA 126 Contlinued SSE VA 136 EMU/TETHERED EVA 126 Contlinued SSE VA 137 EMU/TETHERED EVA 126 Contlinued SSE VA 138 EMU/TETHERED EVA 126 Contlinued SSE VA 138 EMU/TETHERED EVA 126 Contlinued SSE VA 139 EMI/TETHERED EVA 126 Contlinued SSE VA 130 EMI/TETHERED EVA 126 Contlinued SSE VA 131 EMI/TETHERED EVA 126 Contlinued SSE VA 132 EMI/TETHERED EVA 126 Contlinued SSE VA 133 EMI/TETHERED EVA 126 Contlinued SSE VA 132 EMI/TETHERED EVA 126 Contlinued SSE VA 132 EMI/TETHERED EVA 126 Contlinued SSE VA 133 EMI/TETHERED EVA 126 Contlinued SSE VA 132 EMI/TETHERED EVA 126 Contlinued SSE VA 133 EMI/TETHERED EVA 126 Contlinued SSE VA 132 EMI/TETHERED EVA 126 Contlinued SSE VA 133 EMI/TETHERED EVA 126 Contlinued SSE VA 132 EMI/TETHERED EVA 126 Contlinued SSE VA 133 EMI/TETHERED EVA 126 Contlinued SSE VA 132 EMI/TETHERED EVA 126 Contlinued SSE VA 133 EMI/TETHERED EVA 126 Contlinued SSE VA 132 EMI/TETHERED EVA 126 Contlinued SSE VA 132 EMI/TETHERED EVA 126 Contlinued SSE VA 132 EMI/TETHERED EVA 126 Contlinued SSE VA 133 EMI/TETHERED EVA 126 Contlinued SSE VA 132 EMI/TETHERED EVA 126 FPD. to 10/10/08 on 09/8/78. Slip due to Hurricane Faye impacts to HST payload readiness. Fpd. to 10/10/08 on 09/24/08. Slip due to Hurricane Faye impacts to HST payload readiness. Fpd. to 10/10/08 on 09/24/08. Slip due to Hurricane Faye impacts to HST payload readiness. Fpd. to 10/10/08 on 09/24/08. Slip due to Hurricane Faye impacts to HST payload readiness. Fpd. to 10/10/08 on 09/24/08. Slip due to Hurricane Faye impacts to HST payload readiness. Fpd. to 10/10/08 on 09/24/08. Slip due to Hurricane Faye impacts to HST payload readiness. Fpd. to 10/10/08 on 09/24/08. Slip due to Hurricane Faye impacts to HST payload readiness. Fpd. to 10/10 | ALTIMA | TANA | | 740.95 (P) 734.75 (A) | | - | - | - | ^ | | 100 1222 250 | launch attempt of STS-122. |
| MSS Andrew Feustel P793/R340/M294 PERF: NOMINAL SE EVA 132 EMU/TETHERED EVA 125 SCHEDULED EVA 123 DURATION 7:20 SE EVA 133 EMU/TETHERED EVA 126 SCHEDULED EVA 124 DURATION 7:56 Continued MRCGINS (LBS): FPR: 2651 FULL BIAS: 10.63 FINAL TDDP: 1689 RECON:2499 FPDd. to NET Mid-Feb 2009 on 10/30/08. Slip due to training time lost in the aftermath of Hurricane Re. PPDd. to NET Mid-Feb 2009 on 10/30/08. Slip due to draining time lost in the aftermath of Hurricane Full Bias: 10.63 FINAL TDDP: 1689 RECON:2499 FPDd. to NET Mid-Feb 2009 on 10/30/08. Slip due to draining time lost in the aftermath of Hurricane Full Bias: 10.63 FINAL TDDP: 1689 RECON:2499 FPDd. to NET Mid-Feb 2009 on 10/30/08. Slip due to draining time lost in the aftermath of Hurricane Full Bias: 10.63 FINAL TDDP: 1689 RECON:2499 FPDd. to NET Mid-Feb 2009 on 10/30/08. Slip due to draining time lost in the aftermath of the aftermat | 9 | ++ | 7721127074201111211 | SRB STG: | | * * * * * * | | | | | | |
| P793/R340/M294 PERF: NOMINAL 2ENG TAL (MRN): 2:48 (P) 2:55 (A) SS EVA 132 EMU/TETHERED EVA 125 SCHEDULED EVA 123 DURATION 7:20 SS EVA 133 EMU/TETHERED EVA 126 SCHEDULED EVA 124 DURATION 7:56 Continued PAYLOADS: HST SM4, ICBC 3D Advanced from 05/12/09 to 05/11/09 on 05/01/09. Advancing one day provided a 3rd launch opportunity before range conflicts. S125-E-012154 HST Service Crew pose on middeck. Front row (left to right): PLT Johnson, CDR Altman, and McArthur/MS. Back row (left to right): Good/MS, Fuel BIAS: 1063 FiNAL TDDP: 1689 RECON:2499 Faye impacts to HST payload readiness Ppd. to 10/14/08 on 09/24/08. Slip due to training time lost in the aftermath of Hurricane Ike Ppd. to NET Mid-Feb 2009 on 10/30/08. Slip due to HST on-orbit failure of A-side of Control Unit Science Data Formatter Ppd. to NET Mid-Feb 2009 on 10/30/08. Slip due to HST payload readiness Ppd. to 10/14/08 on 09/24/08. Slip due to training time lost in the aftermath of Hurricane Ike Ppd. to NET Mid-Feb 2009 on 10/30/08. Slip due to the checkout problems with HST spare control unit Selected May 12, 2009 launch date on 12/04/08 Advanced from 05/12/09 to 05/11/09 on 05/01/09 Advancing one day provided a 3rd launch opportunity before range conflicts. S125-E-012154 HST Service Crew pose on middeck. Front row (left to right): PLT Johnson, CDR Altman, and McArthur/MS. Back row (left to right): Good/MS, | UNS ++ | + + + + + + = | | | | **** | 96 | THE PARTY | Was It | | | delivery of ET 127 & ET-129 (STS-400). |
| FINAL TDDP: 1689 RECON:2499 SS EVA 132 EMU/TETHERED EVA 125 SCHEDULED EVA 123 DURATION 7:20 SS EVA 133 EMU/TETHERED EVA 126 SCHEDULED EVA 124 DURATION 7:56 Continued FINAL TDDP: 1689 RECON:2499 PAYLOADS: PAYLOADS: PLB: HST SM4, ICBC 3D MIDDECK: HST SM4 S125-E-012154 HST Service Crew pose on middeck. Front row (left to right): PLT Johnson, CDR Altman, and McArthur/MS. Back row (left to right): Good/MS, FINAL TDDP: 1689 RECON:2499 PAYLOADS: PAYLOADS: PHA! to 10/14/08 on 09/24/08. Slip due primarily to training time lost in the aftermath of Hurricane Ike. Ppd. to NET Mid-Feb 2009 on 10/020/08. Slip due to training time lost in the aftermath of Hurricane Ike. Ppd. to NET Mid-Feb 2009 on 10/30/08. Slip due to training time lost in the aftermath of Hurricane Ike. Ppd. to NET Mid-Feb 2009 on 10/30/08. Slip due to training time lost in the aftermath of Hurricane Ike. Ppd. to NET Mid-Feb 2009 on 10/30/08. Slip due to training time lost in the aftermath of Hurricane Ike. Ppd. to NET Mid-Feb 2009 on 10/30/08. Slip due to training time lost in the aftermath of Hurricane Ike. Ppd. to NET Mid-Feb 2009 on 10/30/08. Slip due to training time lost in the aftermath of Hurricane Ike. Ppd. to NET Mid-Feb 2009 on 10/30/08. Slip due to training time lost in the aftermath of Hurricane Ike. Ppd. to NET Mid-Feb 2009 on 10/30/08. Slip due to training time lost in the aftermath of Hurricane Ike. Ppd. to NET Mid-Feb 2009 on 10/30/08. Slip due to training time lost in the aftermath of Hurricane Ike. Ppd. to NET Mid-Feb 2009 on 10/30/08. Slip due to training time lost in the aftermath of Hurricane Ike. Ppd. to NET Mid-Feb 2009 on 10/30/08. Slip due to training time lost in the aftermath of Hurricane Ike. Ppd. to NET Mid-Feb 2009 on 10/30/08. Slip due to training time lost in the aftermath of Hurricane Ike. Ppd. to NET Mid-Feb 2009 on 10/30/08. Slip due to training time lost in the aftermath of Hurricane Ike. Ppd. to NET Mid-Feb 2009 on 10/30/08. Slip due to training time lost in the aftermath of Hurricane Ike. Ppd. to NET Mi | E E | + + | | | | 於★ * * | | 2016 | | y | | |
| SS EVA 132 EMU/TETHERED EVA 125 DURATION 7:20 SS EVA 133 EMU/TETHERED EVA 124 DURATION 7:56 PATAL (M/S 483 FPS): 4:11 (P) 4:12 (A) PTM (U/S 500 FPS): 5:09 (P) 5:12 (A) Continued PTM (U/S 500 FPS): 5:09 (P) 5:12 (A) Continued PRECON:2499 RECON:2499 PAYLOADS: PAYLOADS: PLB: HST SM4, ICBC 3D PAYLOADS: PLB: HST SM4, ICBC 3D PAYLOADS: PDM: HST SM4, ICBC 3D PAYLOADS: PDM: HST SM4, ICBC 3D PM: HST SM4 SETS RMS (83) SRMS, OBSS RECON:2499 training time lost in the aftermath of Hurricane Ike Ppd. to NET Mid-Feb 2009 on 10/30/08. Slip due to checkout problems with HST spare control unit Selected May 12, 2009 launch date on 12/04/08 Advanced from 05/12/09 to 05/11/09 on 05/01/09. Advancing one day provided a 3rd launch opportunity before range conflicts. EMUNCE THERED EVA 126 SUBJECTION 17:56 Continued PARCON:2499 PAYLOADS: PDM: HST SM4, ICBC 3D PM: HST SM4, ICBC 3D PM: HST SM4 PAYLOADS: PDM: HST SM4, ICBC 3D PM: | 0 | · 4 | P793/R340/M294 | <u>PERF</u> : NOMINAL | | *** | | | | | | |
| SS EVA 132 EMU/TETHERED EVA 125 SCHEDULED EVA 123 DURATION 7:20 SS EVA 133 EMU/TETHERED EVA 126 SCHEDULED EVA 127 DURATION 7:56 PTA (U/S 483 FPS): 4:11 (P) 4:12 (A) PTM (U/S 500 FPS): 5:09 (P) 5:12 (A) Continued SS EVA 132 Continued PTA (U/S 500 FPS): 5:09 (P) 5:12 (A) Continued SS EVA 133 EMU/TETHERED EVA 126 SCHEDULED EVA 124 DURATION 7:56 Continued ST EVA 135 EMU/TETHERED EVA 126 SCHEDULED EVA 126 | ELL 23 | 8 | | 2 FNG TAL (MRN): | 2 | | | @ @ | A. A. | | | |
| EMU/TETHERED EVA 125 SCHEDULED EVA 123 DURATION 7:20 SS EVA 133 EMU/TETHERED EVA 126 SCHEDULED EVA 126 DURATION 7:56 PTM (U/S 500 FPS): 5:09 (P) 5:12 (A) Continued EMU/TETHERED EVA 126 SCHEDULED EVA 126 SCHEDULED EVA 126 Continued PTM (U/S 500 FPS): 5:09 (P) 5:12 (A) Continued EMU/TETHERED EVA 126 SCHEDULED EVA 126 SCHED | 17. | 4.50 | SS EVA 132 | | | | | 4 | | 2 | | |
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| SS EVA 133 EMU/TETHERED EVA 126 SCHEDULED EVA 124 DURATION 7:56 Continued S125-E-012154 HST Service Crew pose on middeck Front row (left to right): PLT Johnson, CDR Altman, and McArthur/MS. Back row (left to right): Good/MS, SCHEDULED EVA 124 DURATION 7:56 Continued PTA (U/S 483 FPS): 4:11 (P) 4:12 (A) S125-E-012154 HST Service Crew pose on middeck Front row (left to right): PLT Johnson, CDR Altman, and McArthur/MS. Back row (left to right): Good/MS, Continued Continued Checkout problems with HST spare control unit Selected May 12, 2009 launch date on 12/04/08 Advancing one day provided a 3rd launch opportunity before range conflicts. SETS RMS (83) SRMS, OBSS Continued Continued Continued | | | | | | al ^{pt} | | | - in | 1 | HET CM4 TCDC 3D | Data Formatter. |
| SS EVA 133 EMU/TETHERED EVA 126 SCHEDULED EVA 124 DURATION 7:56 Continued PTA (U/S 483 FPS): 4:11 (P) 4:12 (A) PTM (U/S 500 FPS): 5:09 (P) 5:12 (A) Continued PTM (U/S 500 FPS): 5:09 (P) 5:12 (A) Continued PTM (U/S 483 FPS): 4:11 (P) 4:12 (A) PTM (U/S 500 FPS): 5:09 (P) 5:12 (A) Continued S125-E-012154 HST Service Crew pose on middeck . Front row (left to right): PLT Johnson, CDR Altman, and McArthur/MS. Back row (left to right): Good/MS, SRMS, 0BSS SRMS, 0BSS - Selected May 12, 2009 launch date on 12/04/08 Advancing one day provided a 3rd launch opportunity before range conflicts. LAUNCH SCRUBS: None. Continued Continued | | | DURATION 7:20 | 3:53 (P) 3:56 (A) | | Massa St | | | Maddle Day | | HS1 31014, ICBC 3D | - Ppd. to NET Mid-May 2009 on 10/30/08. Slip due to |
| EMU/TETHERED EVA 126 SCHEDULED EVA 124 DURATION 7:56 PTM (U/S 500 FPS): 5:09 (P) 5:12 (A) Continued EMU/TETHERED EVA 126 4:11 (P) 4:12 (A) 4:12 (A) FTM (U/S 500 FPS): 5:09 (P) 5:12 (A) Continued EMST SM4 S125-E-012154 HST Service Crew pose on middeck . Front row (left to right): PLT Johnson, CDR Altman, and McArthur/MS. Back row (left to right): Good/MS, EMST SMS (83) SRMS (83) SRMS, OBSS IAUNCH SCRUBS: None. Continued Continued | | | SS ΕVΔ 133 | DTA (II/S 402 EDS). | | AL IN | | | | K | MIDDECK: | |
| SCHEDULED EVA 124 DURATION 7:56 PTM (U/S 500 FPS): 5:09 (P) 5:12 (A) Continued Continued Continued Continued SCHEDULED EVA 124 DURATION 7:56 PTM (U/S 500 FPS): 5:125-E-012154 HST Service Crew pose on middeck . Front row (left to right): PLT Johnson, CDR Altman, and McArthur/MS. Back row (left to right): Good/MS, Advancing one day provided a 3rd launch opportunity before range conflicts. SETS RMS (83) SRMS, OBSS Advancing one day provided a 3rd launch opportunity before range conflicts. LAUNCH SCRUBS: None. Continued | | | | 4·11 (P) 4·12 (Δ) | | | | | A LA | | | |
| DURATION 7:56 PTM (U/S 500 FPS): 5:09 (P) 5:12 (A) Continued Continued Continued DURATION 7:56 PTM (U/S 500 FPS): 5:09 (P) 5:12 (A) Continued S125-E-012154 HST Service Crew pose on middeck . Front row (left to right): PLT Johnson, CDR Altman, and McArthur/MS. Back row (left to right): Good/MS, SRMS (83) SRMS, OBSS LAUNCH SCRUBS: None. Continued | | | | (i) 7.12 (A) | | | 0 | The same | Territoria de la compansión de la compan | | E ODVO TANK | |
| Continued | | | | | S125E012154 | A LIOT O | 0 | | | | | before range conflicts. |
| Continued | | | | 5:09 (P) 5:12 (A) | | | | | | | | I AUNCH CODUDC: None |
| Continued Wichittut/Wis. Back fow (left to fight). Good/Wis, | | | Continued | Continued | Moarthur/Mo | Pook row (le | Jonnson ft to right | , CDR | Aitman, ar | id | | LAUNCH SCRUBS: None. |
| ividosiitiiiio/ivio, oturistetu/ivio, attu Feustet/ivio. | | | | Continued | | | | | | | | Continued |
| | | | | | iviassiiiiiii0/ivis | o, Grunsielu/iv | io, and r | eusie | i/ivio. | | | |

| FLT ORBITER NO. | CREW (7) TITLE, NAMES & EVA'S | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS | SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N. | SRB RSRM AND ET | | RBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
|-------------------|---|--|---|---|--------------------------|--------|------------------------|-------|---|---|
| STS-125 Continued | Ontinued SS EVA 134 EMU/TETHERED EVA 127 SCHEDULED EVA 125 DURATION 6:36 SS EVA 135 EMU/TETHERED EVA 128 SCHEDULED EVA 126 DURATION 8:02 SS EVA 136 EMU/TETHERED EVA 129 SCHEDULED EVA 127 DURATION 7:02 MCC WHITE FLIGHT FCR (56) FLIGHT DIRECTORS: ASC/ENT- Norm Knight LD/01- Tony Ceccacci 02- Rick LaBrode Planning- Paul Dye MOD – John Mccullough Team 4- Bryan lunneyi CAPCOMS: A/E - Greg (Box) Johnson - Eric Boe (Wx) LD/01 – Dan Burbank 02 – Alan poindexter Planning – Janice Voss Team 4 - N/A | Continued SE BYD 104 5:39 (P) 5:46 (A) NEG MRN (2@104) 5:59 (P) 6:02 (A) SE PRESS 109 6:22 (P) 6:29 (A) MECO CMD: 8:23.4 (P) 8:24.3 (A) VI: 26088.0 (P) 26086.0 (A) OMS-2: 43:46 (P) 43:45.0 (A) 142.5 (P) 139.7 (A) FPS Continued from col @ right FLT DURATION: 12:21:37:18 S/T: 1196:08:46:46 OV-104: 271:04:42:58 DISTANCE: 5,276,106 sm TOTAL SHUTTLE DISTANCE: 490,854,365 sm | Continued TD NORM 205: | \$125E007221 | d mirro vities in | red re | eflection d install | durin | g first HST | Continued LAUNCH WINDOW: Total launch window was 59M 45S with window open at 131:17:44:01Z and close at 131:18:43:46Z. Preferred Launch Time was 131:18:01:56Z (In-Plane Time) for a launch window of 41M 50S. LAUNCH DELAYS: None. Launch occurred on time at 131:18:01:56Z, 2:01:56 p.m. EDT, Monday, May 11, 2009. The Spaceflight Meteorology Group (SMG) forecast no flight rule violations for launch or RTLS. The SMG also tracked a large wildfire 18nm northwest of KSC that stayed north of the orbiter track for an RTLS if needed. TAL WEATHER At Moron, the only TAL site for the HST low inclination orbit, a trough of low pressure initially resulted in a "NO GO" with a slight chance of showers within 20nm. Balloon data showed the atmosphere was too dry for showers and the forecast was updated to "GO" at 1636Z. Peak crosswinds of 15.5 kts surpassed the 15kt limit for a brief time at TAL landing, however, the FD had previouly stated a peak crosswind of 17kts was acceptable. PERFORMANCE ENHANCEMENTS: Include the standard set plus: PE Operational High Q TRN/MAY FLIGHT DURATION CHANGES/LANDING: - For both KSC landing opportunities on Friday, May 22nd the unstable weather was no go with low ceilings and thunderstorms expected. Landing was postponed to Saturday (EOM + 1) KSC weather was no go for EOM+1 with broken low ceilings and thunderstorms. Little change was expected for Sunday (EOM+2) and Monday (EOM+3) as moisture remained abundant over KSC KSC landing for Sunday (EOM+2) waived off due to weather. Next opportunity to EDW's was selected on EOM+2 with typical summer weather and mostly clear skies. Landing occurred at 144:15:39:04Z (10:39:04 AM CDT Sunday, 05/24/09). FIRSTS/LASTS: - First mission post-STS-107 incident without ISS safe haven. LON STS-400 mission was on standby on PAD 39B. "First time since 2001 that two such birds have simultaneously perched on NASA's twin shuttle launch pads" - Todd Halvorson, Florida Today 116 new EVA tools (GSFC) were developed to meet unique demands of this HST SM Firs |

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | OI | RBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|--------------|-------------------------------|--|-------------------------------|-------------|-----|-------|-----|---------------------|--|
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, WINDS | PROFILE FNG S N | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |

STS-125



S125-E-008120 (16 May 2009)-- Andrew Feustel moves Corrective Optics Space Telescope Axial Replacement (COSTAR) in 3rd EVA to upgrade HST.



JSC2009-E-120479 --- In MCC: Members of the STS-125 Hubble Space Telescope Planning and Orbit Flight Control Team.



S125-E-009918 (18 May 2009) "Hugging the Hubble!" - Grunsfeld, on end of RMS, and Feustel, conduct mission's fifth and final HST service EVA: Replaced batteries, a Fine Guidance Sensor, and three thermal blankets (NOBL).

NOTE: Dr. John M. Grunsfeld was later appointed Deputy Director of the Space Telescope Science Institute (STScI) in Baltimore, Md. effective January 4, 2010.



JSC2009-E-118819 --- In MCC: John McCullough (seated foreground), Chief Flight Directors Office; Brent Jett (seated right), Director, Flight Crew Operations; Lead Flight Director Tony Ceccacci (standing, left); and Asc/Des Flight Director Norm Knight (standing, right).

Continued... FIRSTS/LASTS:

- First flight of ATK BSM's in both forward and aft positions
- SRB Frangible nut redesigned with pyrotechnic crossover assembly
- Mike Massimino first to 'Tweet' from space, through email to JSC to his Twitter.
- First job offer in space: John Grunsfeld, while flying high in space, was named an adjunct professor at the University of Colorado at Boulder
- Fifth & last HST Service mission.

NIGHT LAUNCH: N/A

RENDEZVOUS: #73 Rendezvous with HST.

EVENTS:

- FD1: OMS2 ignition at 131:18:45:40.9Z resulted in a 298.1 by 106.6 NM orbit.
- T1 maneuver at 133:14:41:56.0Z resulted in a 303.2 by302.9 NM orbit
- FD2: RCC inspection found no areas of concern no requirement for Focused Inspection.
- FD3: HST Grapple by McArthur occurred at 133:17:14Z. Timeline was about 20 min. behind schedule due to a comm. problem with HST that delayed HST prep for capture.
- FD4: EVA 1: Grunsfeld & Feustel: Activities included installing and completing good aliveness tests for new WFC3 and SI C&DH unit. The HST can now see farther into space and across a wider spectrum of colors. EVA ran 50 min longer than planned as the crew encountered difficult (aging) latches and bolts. EVA1 duration 7:20.
- FD5: EVA 2: Massimino & Good: Activities included Rate Sensor Unit changeouts & Bay 2 Battery checkout. EVA ran long due to the challenges for seating and bolting of RSU's. EVA2 duration 7:56.
- FD6: EVA 3: Grundsfeld & Feusel: Activities included replacement of the COSTAR instrument with the Cosmic Origins Spectrograph and repair of the Advanced Camera for Surveys. EVA3 duration 6:36.
- FD7: EVA 4: Massimino & Good: Activities included refurbishment of Space Telescope Imaging Spectrograph and replacement of 6 Gyros. EVA 4 duration 8:02 (6th longest in program history).
- FD8: EVA 5: Grundsfeld & Feustel: Activities included Bay 3 battery changeout and FGS 2 changeout. On way back to A/L crew found debris liberated from carrier and head under HST. On retrieving the debris, PLSS contact damaged the TPS cover on the Low Gain Aantenna (LGA). The LGA cover was reinstalled. The HST was in a good configuration for long term exposure to space. EVA5 duration 7:02.
- On departing the telescope, astronaut Grunsfeld called the week a "tour de force of tools and human ingenuity." He also added: "Hubble Isn't Just a Satellite, It Is About Mankind's Quest for Knowledge".
- FD9: HST was released at 139:12:57:00Z. This was followed shortly by OBSS late inspection of Atlantis TPS.
- During Entry comm blackout occurred at GMT 144/1513 1517 due to plasma effect.

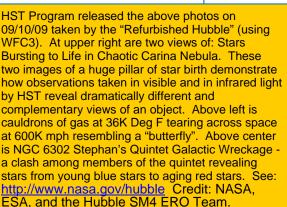
| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | ORE | BIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|-------------------------|-------------------------------|--|-------------------------------|-------------|-------|-------|-----|--------------------------|---|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, | THROTTLE PROFILE | AND ET | INC I | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |

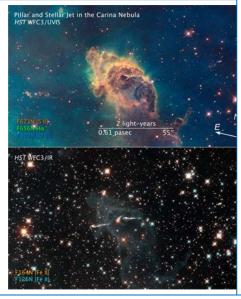
STS-125 Continued.

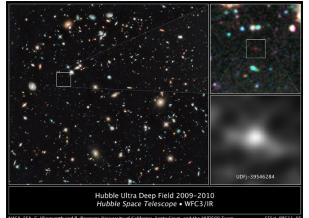












SIGNIFICANT ANOMALIES:

Orbiter:

- FWD STBD PLB FLOODLIGHT (#2) FAILED DURING STS-125
- DURING SSME IGNITION, AN ÈLÉCTRICAL ANOMALY OCCURRED THAT CAUSED ASA 1 TO BE LOST.
- AFTER CARRIER PANEL REMOVAL AN IN-PLANE CRACK WAS DETECTED AT THE DENSIFICATION LAYER INTERFACE WITH BASE MATERIAL ON TILES V070-395018-143 (SERIAL S83057) AND V070-395018-151 (SERIAL 7HB1DR)
 THE CREW DISCOVERED CARRYOVER OR UNPROCESSED CONDENSATE
- THE CREW DISCOVERED CARRYOVER OR UNPROCESSED CONDENSATE IN THE IMMEDIATE AREA OF THE HUMIDITY SEPARATORS IN THE LOWER EQUIPMENT BAY.
- THE IMU FAN DELTA PRESSURE (V61P2869A) WAS OBSERVED TO SLOWLY INCREASE ON FD 12, WITH THE FIRST INCIDENCE OF TOGGLING ABOVE THE FLIGHT RULE LIMIT OF 4.71 PSI OCCURRING AT GMT 142/18:22:37.
- DURING SSME IGNITION AN ELECTRICAL SHORT OCCURRED ON THE 26VAC EXCITATION CIRCUIT BETWEEN AEROSURFACE SERVOAMPLIFIER 1 (ASA-1) AND THE RIGHT HAND INBOARD ELEVON ACTUATOR PRIMARY DELTA PRESSURE TRANSDUCER.
- MDU CRT 4 REPORTED 'MSG COM 1553B ERROR', 'MESSAGE 1553B FAIL' AND 'MEDS I/O ERROR' IN DOWNLIST AT NOSE GEAR TOUCHDOWN. KSC:
- Fondu-Fyre Liberated from SRB Main Flame Deflector, STS-125, Pad A
- Brick Liberated from East Flame Trench Wall, SSME Side, STS-125, Pad A <u>SRB</u>: None. <u>SSME</u>: None. <u>ET</u>: None. <u>MOD</u>: None. RSRM:
- MISSING STIFFENER RING FOAM WITH DISCOLORATION, STIFFENER RINGS. RSRM-105B

Integration:

- Aerosurface Servo Amplifier-1 (ASA-1) Power Supply Failed
- Unexpected Debris/Expected Debris Exceeding Mass Allowable Prior to Pad Clearance (Liftoff Debris)
- Ice Internal and External to the LH2 T-0 Umbilical
- Gap Filler Releases From Port OMS Pod

At Left: HUBBLE DETECTS - MOST ANCIENT OBJECT On Jan 26, 2011, NASA reported that Hubble using its new camera, discovered a faint red blob (see ultra-deepfield exposure insert above right) thought to be the most distant object ever seen: a small proto galaxy some 13.2 billion light years away (faint optical image in insert below right). This galaxy existed 480 million years after the "Big Bang". These exposures were taken in 2009 & 2010. Credit NASA, ESA, G.Illingworth (U. of Calif Santa Cruz & R. Bouwens (U. of Calif, Santa Cruz & Leiden U.), & HUDF09 Team.

| | | ı | | LANDING CITE! | COME TI | | | | | | |
|---------------------------------------|---------------|----------------------------|-------------------------------------|--------------------------|----------------------|-----------------------|-----------------|---------------------------|----------------------------|--------------------------------|---|
| | | CREW | LAUNCH SITE, | LANDING SITE/ RUNWAY. | SSME-TL NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (6+1 UP/6+1 DN) | LAUNCH SITE, LIFTOFF TIME. | CROSSRANGE | EMERG | RSRM | | ORBIT | FSW | | (LAUNCH SCRUBS/DELAYS, |
| NO. | UNDITER | | LANDING SITES. | LANDING TIMES | THROTTLE | AND | INC | HA/HP | 1 3 1 1 | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| IVO. | | TITLE, NAMES | ABORT TIMES | FLT DURATION, | PROFILE | ET | IIVC | I IA/I IF | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| | | & EVA'S | ADORT TIMES | WINDS | ENG. S.N. | L' | | | | LAI LINIVILIVIS | TINOTO, SIGNIFICANT ANOMALIES, ETC.) |
| STS-127/ | OV-105 | CDR: | | KSC 15 (KSC 71) | 104/104/109% | BI-138 | | | | CARGO: | Brief Mission Summary: STS-127 (29th mission to ISS) was a |
| ISS-2JA | (Flight 23) | Mark Polansky | KSC 39A | 212:14:48:07Z | | | 51.6 | | OI-33 | 36253LBS | "16 day marathon construction mission". The final pieces of |
| 155-ZJA | ENDEAVOUR | (Flt 3 - STS-98,STS-116) | 196:22:03:09Z | 09:48:07 AM CDT | PREDICTED: | RSRM | (29) | INSERTION | (3) | | the Japanese Kibo Complex including an Experiment |
| | | P794/R262/V185/M228 | 6:03:10 PM EDT (P) | Friday (15) | 100/104.5/104.5/ | 106 | | DOOT 0140 0 | | <u>PAYLOAD</u> | Exposed Facility ("Porch in Space" - PAO) and the |
| SEQ | | | 6:03:10 PM EDT (A) | 07/31/09 (12) | 72/104.5 | | | POST OMS-2: | | CHARGEABLE: | unpressurized Experiment Logistics Module were delivered |
| FLT # 127 | OMS PODS | <u>PLT</u> | Wednesday (15) | | | ET-131 | | 123.8x32.3 NM | | 24682 LBS | along with spare equipment intended to keep ISS |
| VCC 107 | LPO3 -33 | Doug Hurley | 07/15/09 (10) | DEORBIT BURN: | ACTUAL: | | | DEORBIT: | | DEPLOYED: | operational long after Shuttle is retired. Five EVA's and |
| KSC-127 | RPO4 29 | P795/R341/M295 | LALINGLUMINDOM | 212:13:41:09.9Z | 100/104.5/100// | SLWT | | HA 184.5 NM | | 24266 LBS | operations of three robotic arms were conducted for |
| PAD 39A | FRC5-22 | | LAUNCH WINDOW: | | 72/104.5 | 35 | | HP 22.2 NM | | 2 1200 250 | completion of all objectives. |
| (50) | | MS 1 | 10M 0S (Total) 5M 0S (Preferred) | XRANGE: 672.5 NM | | ET | | 111 ZZ.Z IVIVI | | NON-DEPLOYED: | |
| (30) | | Christopher Cassidy | ` ′ | ODDIT DID A/I (41) | 1 = 2045 (10) | <u>IMPACT</u> | | ENTRY | | 290 LBS | KSC W/D: |
| | | P796/R342/M296 | EOM PLS: KSC | ORBIT DIR: A/L (41) | | 1:14:27 | | VELOCITY: | | MIDDECK | OPF: 109 + 9H |
| MLP-3 | | MS 2 | TAL: MRN | AIM PT: Nominal | 3 = 2054 (9) | MET | | 25855 FPS | | MIDDECK: 126 LBS | VAB: 7 + 0C PAD B: 32 + 10C + 1 SD (STS-125 launch) + 1 CR (Crew Rest |
| | | Julie Payette (Canada) | TAL WX: ZZA. | AIIVI P I . INUITIIITAI | M 3 EOM: | | | - | | 120 LD3 | Day) |
| 29 th | | (Flt 2-STS-96) | TAL WA. ZZA. | MLGTD: 1797 FT | WEIGHT: | LAT: | | <u>ENTRY</u> | | SHUTTLE | PAD A: 42 + 3C + 1H |
| SHUTTLE | | P797/R249/V205/F33 | SELECTED: | 212:14:48:07Z | 215899.5 LBS | 35.889 S | | RANGE: | | ACCUMULATED | Total Work Days = 190 (OPF processing occurred |
| FLIGHT | | 1 777112477 \$20071 33 | RTLS: KSC15 N/N | VEL: 208 KGS | X CG: | 00.007 0 | | 4334 NM | | WEIGHTS: | over a total time period of 118 days.) |
| TO ISS | | MS 3 | TAL: MRN20 N/N | 209 KEAS | 1089.8 IN | LONG: | | | | DEPLOYED: | over a total time period of 110 days. |
| | | Tom Marshburn | AOA: NOR 17 N/SFD | | | 157.79 W | | | | 1548698 LBS | POSTPONEMENTS: |
| | | P798/R343/M297 | SB | | LANDING: | 107.77 | | | | NON DEDI OVED | - Added STS-127 to FDRD - launch date of 04/23/09 on 04/24/08. |
| | | | 1ST DAY PLS: EDW | TD NORM 195: | WEIGHT: | | | | | NON-DEPLOYED: | - Ppd. to 05/15/09 on 07/03/08. Slip due to ET deliveries. |
| | HURLEY PAL | | 22L N/N | 2865 FT | 215816.5 LBS | | | | | 1621661 LBS | - Ppd. to 06/13/09 on 03/10/09. Slip due to interim changes while |
| (ida | ** * * * | | | | X CG: | | | | | CARGO TOTAL: | Cx and SSP schedules were assessed and prioritized. |
| | * 7 | | TDEL: | DRAG CHUTE | 1091.7 IN | | | | | 4090475 LBS | LAUNOU CODUDO |
| 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 2/ 11/1 | . + | 0.000 (P) -0.308 (A) | <u>DEPLOY</u> : 186 KEAS | | | | | | | LAUNCH SCRUBS: - Launch scrubbed officially on Saturday, 06/13/09 at 12:26 a.m. |
| 1-1 | 151 | 7 | MAYONAY | 212:14:48:13Z | | | Marie Company | | A.P | <u>PERFORMANCE</u> | EDT due to GH ₂ leak at the GUCP – the same type of leak that |
| | | \$ (A) | MAX Q NAV: | <u>NLGTD</u> : 5842 FT | | | | | | MARGINS (LBS): | scrubbed STS-119 in March. Launch rescheduled for 06/17/09. |
| | Can t aug | | 722.7 (P) 705.3 (A) | 212:14:48:19Z | | 1111111 | | | | FPR: 2651 | Technical Scrub. |
| | ASSIDY WARREN | | CDD CTC: | VEL: 152 KGS | | | | | 10 | FUEL BIAS: 1059 | - Launch scrubbed officially on Wednesday 06/17/09 at 1:55 EDT |
| 00 (NSS) | | | SRB STG: 2:04.2 (P) 2:03.8 (A) | 150 KEAS | | TO THE REAL PROPERTY. | | | | FINAL TDDP: 2553 RECON:2734 | with the reoccurrence of the same type of GUCP leak as |
| | | MS 4 | 2.04.2 (1) 2.00.0 (A) | HDOT: -5.0 FPS | | | TO P | | | RECUN:2/34 | previous scrub. Launch rescheduled for 07/11/09. Technical |
| | | Dave Wolf | PERF: NOMINAL | | 3 | | | | 1 | PAYLOADS: | Scrub. |
| | | (Flt 4 - STS-58, Up to Mir | | BRK INIT: 71 KGS | | | | | | PLB: | - Launch officially scrubbed during L-11 Hour Hold at MMT |
| INTER | NATIONAL | on STS-86, Dn on STS-89, | 2 ENG TAL (MRN): | | | | A | | 14 | ISS-2J/A, ANDRE- | meeting on Saturday morning, 07/11/09, due to unstable weather |
| ICC-VLD | SIATION | STS-112) | 2:29 (P) 2:35 (A) | DRAG CHUTE | | · · | C.W. | \$ 2 3 1 | | 2, DRAGONSAT | and lightning strikes overnight in KSC area. Seven strikes hit the |
| | ELM-ES | P799/R173/V147/M151 | 2.27 (1) 2.00 (1) | JETTISON: | | | MILE | 3/1 | | MIDDEOL | lightning protection system, but none hit the vehicle. Launch |
| | JEM-EF) | | NEG MRN (2@ 104): | 56 KGS | | | | | 17 | MIDDECK: | rescheduled for 07/12/09. Weather Scrub. |
| | | MS 5 UP Stay ISS | 3:53 (P) 3:58(A) | 12:14:48:52Z | | www. | 1 | | | ISS-2A,MAUI, SEITE,SIMPLEX | - Launch scrubbed during a final hold at T-9 minute mark on |
| | | EXP20/FLT ENG | , , | BRK DECEL FPS2: | Conseque la | | at the c | la ali aassa d | OTC. | SEITE, SIIVIPLEX | Sunday 07/12/09 due to predicted thunderstorms within 20 nm |
| ST | S-127 | T1m Kopra | PTA (U/S 158 FPS): | AVE 4.8 PK 6.3 | daseous hyd | Morch 20 | π line | leak caused So caused two | 515- | 5 CRYO TANK | limit of SLF. Launch rescheduled for 07/13/09. Weather Scrub. |
| 12 | ZJ/A | P800/R344/M298 | 5:02(P) 5:10(A) | AVE 4.0 IN 0.3 | | | | e connects the | | SETS | - Launch scrubbed at 6:39 PM EDT on Monday 07/13/09 due to weather violations in KSC area. Launch rescheduled for |
| - | | 0 " 1 | | | Ground Umb | | | | 0 | ODS, SRMS (84), | 07/15/09. Weather Scrub. |
| | | Continued | | Continued | | | | k" for burn-off | of | OBSS.SSPTS. | OTTISTOT. WEARING SCIUD. |
| | | | Continued | vented gase | | | K 101 Dull1-011 | Ji | ECSHS(2),ROEU, PPSUS(2) | | |
| | | | | | Tomba gaoc | 240 .19410 | 30111 | | | PPSUS(2) | Continued |
| | • | | | | | | | | | | |

| | | | SP | ACE SH | JTTLE I | MISS | SIOI | NS SU | MN | IARY | Page 2-210 - STS-127 |
|--|---|--|--|---|----------------------------------|-------------|------|---------------------------|------|--------------------------|--|
| FLT | ORBITER | CREW (6+1 UP/6+1 DN) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-127/ | | Continued | Continued | Continued | | | | | | | Continued |
| ISS-2JA Continued | | MS 5 DN EXP 18/19/20 FLT ENG (Japan) Koichi Wakata | <u>SE TAL (ZZA 104)</u> : 6:03(P) 6:08(A) | WHEELS STOP: | | | 2.0 | | X | | LAUNCH WINDOW: Total launch window was 10M 5S wit window open at 196:21:58:10Z and close at 196:22:08:10Z Preferred Launch Time was 196:22:03:10Z (In-Plane Time |
| | | (Flt 3 - STS-72,STS-92, | PTM (U/S 181 FPS): | 212:14:49:13Z | | EIIT | 7= | | 11 | | launch window of 5M OS. |
| | | Up on STS-119 stay ISS) P801/R208/V164/M181 | 6:01(P) 6:14(A) | 11856 FT | 300 | | | | | | LAUNCH DELAYS: - None. Launch occurred on time at 196:22:03:10Z, 6:03:1 |
| J. G. | | | SE PRESS 104 6:52(P) 7:01(A) | ROLLOUT: | | | | | | 7 | EDT, Wednesday, July 15, 2009. The Spaceflight Meteoro Group (SMG) forecast was challenged by thunderstorms al |
| - 25 | | SS EVA 137 DOCKED QUEST EVA 55 | MECO CMD: | 10059 FT | | | | | | | east coast breeze throughout the day. However, the weather improved at the SLF and within the 20nm limit prior to launce |
| THE STATE OF THE S | SEC. | EMU/TETHERED EVA 130 SCHEDULED EVA 128 | 8:22.4(P) 8:24.9(A) | 1:06 M:S WINDS: | | | | | | | "Go". |
| Ctoron | (A/A) | DURATION 5:32 | VI. | 7H KT 6R KTS | | | | | | | TAL WEATHER: TAL weather also cooperated for a Go for |
| EDI | | SS EVA 138 DOCKED QUEST EVA 56 | vi: 25819(P) 25820(A) | 19008P13KT | | Va | > | | 9 | | launch. A high pressure system produced dry and stable conditions across southern Spain. The two Spanish TAL si |
| | | EMU/TETHERED EVA 131 SCHEDULED EVA 129 | OMS-2: | (X5P7 H7P11) | | | | etired NASA | | | were forecast for clear skies and winds within flight rule lim Istres was forecasting a slight chance of a ceiling below flig |
| | | DURATION 6:53 | 35:45 (P) 38:30(A) 98.7(P) 96.9(A) FPS | <u>DENS ALT</u> : 1916 FT | | | | with Associa Gerstenma | | | limits for launch day. |
| | | SS EVA 139 | | FLT DURATION: 15:16:44:58 | | | | unch countd | | | PERFORMANCE ENHANCEMENTS: Include the standard set plus: 1) PE Operational High Q SU |
| OF WINN | POMAHENNO | DOCKED QUEST EVA 57 EMU/TETHERED EVA 132 | | <u>S/T</u> : 1212:01:31:44 | | | | 1 | | | 2) OMS Assist, 3) a 52 nautical mile MECO, and 4) Del Psi |
| ARBATT | * · · · · · · · · · · · · · · · · · · · | SCHEDULED EVA 130 | | 1212.01.31.44 | | | | | 11.7 | | FLIGHT DURATION CHANGES: NONE |

DURATIO N 5:59

SS EVA 140 DOCKED QUEST EVA 58 EMU/TETHERED EVA 133 SCHEDULED EVA 131 DURATIO N 7:12

SS EVA 141 DOCKED QUEST EVA 59 EMU/TETHERED EVA 134 SCHEDULED EVA 132 **DURATION 4:54**

Continued...

266:15:33:01 DISTANCE: 6,547,853 sm TOTAL SHUTTLE

OV-105:

DISTANCE: 497,402,218 sm



ISS020-E-022626 (20 July 2009) --- Endeavour's crew cabin, along with the ISS's Kibo laboratory and Harmony node are shown during 2nd EVA.

was 10M 5S with at 196:22:08:10Z. Z (In-Plane Time) for a

22:03:10Z, 6:03:10 p.m. aceflight Meteorology thunderstorms along the wever, the weather limit prior to launch for a

erated for a Go for dry and stable vo Španish TAL sites thin flight rule limits. ceiling below flight rule

ational High Q SUM/JUL, O, and 4) Del Psi

Planned landing at KSC on orbit 248. Landed at KSC Runway 15 on orbit 248 at 212:14:48:07Z on Friday, July 31, 2009.

FIRSTS/SECONDS/LASTS:

- Five launch scrubs is second highest number: STS-73 in 1995 & STS-61C in 1986 had six.
- Koichi Wakata, first Japanese astronaut to have engaged in longduration on-orbit, returned to Earth after 4 1/2 months.
- First flight of SSME controller constant updates, an updated MPS propellant inventory, and an updated CMR.
- Record-size space crew of thirteen (ISS & Shuttle).

NIGHT LAUNCH: N/A

RENDEZVOUS: #74 Rendezvous and dock with ISS.

| FLT | ORBITER | CREW (6+1 UP/6+1 DN) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|----------|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----------|-----------|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-127/ | | Continued | | | | | | Continued | | |

STS-127/ ISS-2JA Continued ...

MCC WHITE FLIGHT FCR (57)

FLIGHT DIRECTORS: SHUTTLE:

A/E- Bryan Lunney LD/O1- Paul Dye O2- Kwatsi Alibaruho Planning- Gary Horlacher - Mike Sarafin MOD – John Mccullough Team 4- Richard Jones

ISS

O1 - Brian Smith LD/O2 – Holly Ridings

O3 – Derek Hassmann Team 4 - Ron Spencer

CAPCOMS:

SHUTTLE

A/E – Alan Poindexter
- Eric Boe (Wx)
LD/O1 – Greg (Box) Johnson
O2 - Janice Voss
Planning - Stan Love
- Shannon Lucid
Team 4 - N/A

100

O1 – Hal Getzelman LD/O2-Akihiko Hoshide O3 – Jason hutt Team 4 – N/A



S127-E-009733 (28 July 2009) --- Record Size Space Crew: The STS-127 and Expedition 20 crew members pose for a group portrait in ISS Harmony Node. From left (front row) are NASA astronauts Michael Barratt, Exp 20 FE; Mark Polansky, STS-127 CDR; cosmonaut Gennady Padalka, Exp 20 CDR; and NASA astronaut Dave Wolf, STS-127 MS. From left (middle row) are JAXA astronaut Koichi Wakata, STS-127 MS; Canadian astronauts Julie Payette, STS-127 MS and Robert Thirsk, Exp 20 FE; and NASA astronaut Tom Marshburn, STS-127 MS. From left (back row) are cosmonaut Roman Romanenko, Exp 20 FE; NASA astronauts Christopher Cassidy, STS-127 MS; Doug Hurley, STS-127 Pilot; Tim Kopra, Exp 20 FE; and ESA astronaut Frank De Winne, Exp 20 FE.

EVENTS:

- During liftoff several pieces of foam insulation came off the ET. Shuttle was hit
 two or three times, said Bill Gerstenmaier. Some scuff marks were spotted on
 the belly, but that probably is coating loss and considered minor, he said. That
 was later determined to be the case.
- FD1: OMS2 ignition at 196:22:41:40.0.9Z resulted in a 125.4 by 85.1 NM orbit.
- FD2: RCC inspection found no areas of concern
- T1 maneuver at 198:15:17:25.9Z resulted in a 188.7 by184.0 NM orbit
- FD3: R-Bar Pitch Maneuver was performed. No issues.
- Hard Dock, hooks closed, occurred at 198:15:47:10Z (12:47 CDT, July 17, 2009)
- ISS Hatch opened at 198:17:48:10Z (2:48 PM CDT, July 17, 2009) welcomed by ISS crew.
- IELK Seat Liner Transfer at 198:19:22:10Z (9:00 PM CDT March 17, 2009). At that time Koichi Wakata became a member of STS-127 and Tim Kopra joined the ISS Expedition 20 as Flight Engineer.
- Reboost ~2.5 fps posigrade delta V. Increased altitude approx 4700 ft . Cleared vehicles of conjunction with Object 84180.
- FD4: Based on review of launch imagery, MMT cancelled FD5 focused inspection of Orbiter heat shield.
- FD4: EVA 1: David Wolf & Tim Kopra: Activities included: JPM berthing mechanism prep and install, CETA cart mods, and the P3 Nadir UCCAS deploy. EVA was shortened due to suit consumables. The PAS deploy was ppd. EVA1 duration 5:32.
- Using the SSRMS and SRMS the JEM Exposed Facility (JEF) was successfully unberthed from the Shuttle P/B and captured on the Japanese Experiment Module (JEM).
- FD6: EVA2: Dave Wolf & Tom Marshburn: Activities included: Transfer of ORU's (Space-to-Ground Antenna, Linear drive Unit & Pump Module) from the Integrated Cargo Carrier (ICC) to the External Stowage Platform. Installation of the JEF forward Vision Equipment [VE] was deferred.
 FVA2 duration 6:53.
- FD8: EVA3: Dave Wolf & Chris Cassidy: Activities included: Node 2 WIF 14 removal and installation to COL WIF 2, JLE payload prep, completion of 2 Lab FPP grounding sleeves, changeput of 2 of 6 batteries on P6 (batts A & B from the ICC-VLD) and positioning of ICC-VLD in overnight parking configuration. EV2's LiOH performance caused early termination. EVA3 duration 5:59.
- FD10: EVA4: Chris Cassidy & Tom Marshburn: Activities included: successful R&R of all batteries and successful latching of the ICC-VLD back into the Shuttle P/L bay for return. EVA4 duration 7:12.

Continued

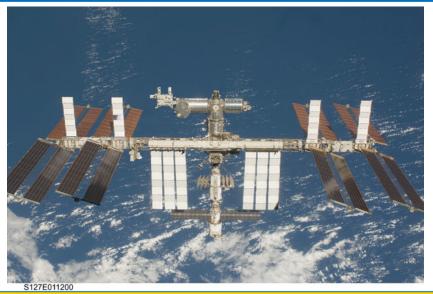
| FLT | ORBITER | CREW (6+1 UP/6+1 DN) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|-------------------------|-------------------------------|---|--------------------------------|-------------|-----------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE FNG.S.N | AND ET | INC HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |

STS-127/ ISS-2JA Continued ...

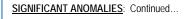


JSC2009-E-145586 --- Orbit 1 Lead FD Paul Dye (foreground) on console during docking of STS-127 Endeavour to ISS. In background are CAPCOM's Dominic Gorie (far left) and Greg Johnson.

BELOW: S127-E-009372 (27 July 2009) Marshburn (left) & Cassidy, STS-127 MS's, participate in fifth and final EVA as construction and maintenance continue on the ISS.



S127-E-011200 (28 July 2009) --- The ISS is seen from Space Shuttle Endeavour as the two spacecraft begin their relative separation.



ET:

- POST-LAUNCH CAMERA AND FILM REVIEW SHOWED LOSS OF FOAM AT SEVERAL LOCATIONS ON THE INTERTANK.
- POST-LAUNCH CAMERA & FILM REVIEW SHOWED LOSS OF FOAM IN THE AFT INBOARD CORNER OF THE $\rm LO_2$ ICE FROST RAMP AT STATION 718
- ET TPS Loss Outboard Section of the -Y Bipod Closeout $\underline{\mathsf{MOD}} .$ None.

Integration:

- Unexpected Debris/Expected Debris Exceeding Mass Allowable Prior to Pad Clearance (Liftoff Debris)
- LH₂ Leak at ET Ground Umbilical Carrier Plate (GUCP)
- Ice Internal and External to the LH₂ T-0 Umbilical

EVENTS: Continued....

- FD13: EVA5: Chris Cassidy & Tom Marshburn: Activities included: completion of Z1 patch panel reconfig, SPDM covers, JEF Vision Equipment installation and several get-aheads (JEM handrail and WIF installation, Lab cable tiedowns, Node 2 Gap Spanner installation, and relocating two APFR's for STS-128). The S3 Zenith Outboard PAS task was not performed due to lack of time based on predicted METOX capability. EVA5 duration 4:54.

Transfers

- 24,638 Pounds of hardware transferred to ISS (inside & out)
- 10,479 Pounds of hardware returned aboard Endeavour
- 2,175 Pounds of middeck items delivered to ISS aboard Endeavour
- 1,980 Pounds of middeck items returned from ISS to Endeavour
- 1,225 Pounds of water transferred to ISS
 - 45 Pounds of Oxygen used for "stack maintenance"
 - 12 Pounds of Nitrogen transferred to ISS
- ISS Mass in space 685,986 mass pounds
- FD14: Undocked at 209:17:26:00Z (12:26 PM CDT, July 28, 2009)
- After undocking, Hurley initiated Endeavour fly-around at a distance of 400 feet from ISS and completed Sep-maneuver at 209:19:09:00Z (2:09 PM CDT, July 28, 2009)
- During Entry comm blackout occurred at 212:14:34:05Z 212:14:36:24Z due to plasma effect.

SIGNIFICANT ANOMALIES:

Orbiter:

- MICROBIAL REMOVAL ASSEMBLY LEAKAGE
- FUEL CELL 3 SN 121 SUSTAINING HEATER TURNED ON WHEN THE FC STACK OUT TEMPERATURE REACHED A VALUE OF 185 DEG F
- DURING THE RCS HOTFIRE TEST, FORWARD RCS THRUSTER F2F EXHIBITED LOW PC (V42P1542A) OF APPROXIMATELY 16 PSI. F2F WAS DECLARED FAILED OFF AND AUTO DESELECTED BY RCS RM AT MET 14/10:45:40 (GMT 211/08:48:50).

KSC

- The Istres Backup Azimuth system is in a Hard Overscan Alarm
- STS-127 Post Launch Debris

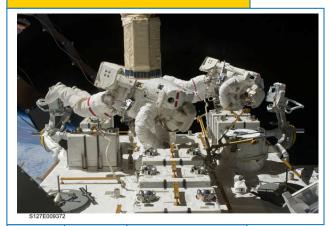
SRB

- TOP LAYERS OF MSFC CONVERGENT COATING (MCC-1) MISSING ON AFT SKIRT TPS ACREAGE (BOTH LEFT & RIGHT HAND)POST FLIGHT OF STS-127/BI-138
- LEFT-HAND SOLID ROCKET BOOSTER ENHANCED DATA ACQUISITION SYSTEM (EDAS) ASSEMBLY CHANNEL 4 DID NOT RECORD NOMINAL STRAIN RESPONSE.

RSRM: None.

SSME: None.

Continued at left...



| FLT NO. | ORBITER | CREW (6+1 UP/6+1 DN) TITLE, NAMES & EVA'S | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS | SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N. | SRB RSRM AND ET | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
|--|--|--|--|---|--|--|--------------|--|--------------|---|--|
| STS-128 (17A) SEQ FLT # 128 KSC-128 PAD 39A (51) MLP-2 30 th SHUTTLE FLIGHT TO ISS | OV-103 (Flight 37) DISCOVERY OMS PODS LPO1 -40 RPO3-38 FRC3-37 | CDR: Rick Sturckow (Flt 4 - STS-88,STS-105 STS-117) P802/R247/V173/M215 PLT Kevin Ford P803/R345/M259 MS 1 Patrick Forrester (Flt 3 - STS-105, STS-117) P804/R269/V186/M235 MS 2 Jose Hernandez P805/R346/M300 MS 3 Danny Olivas (Flt 2-STS-117) P806/R309/V207 /M267 MS 4 Christer Fuglesang (ESA) (Flt 2 - STS-116) P807/R304/V208/M264 | MAX Q NAV: | EDW22 CONC EDW 54 CONC 35 255:00:53:20Z 7:53:20 PM CDT Friday (16) 09/11/09 (12) DEORBIT BURN: 254:23:47:37Z XRANGE: 374.6NM ORBIT DIR: A/L (42) AIM PT: Nominal MLGTD: 1515 FT 255:00:53:20Z VEL: 220 KGS 199 KEAS HDOT: -4.3 FPS TD NORM 195: 1753 FT DRAG CHUTE DEPLOY: 155 KEAS 255:00:53:32Z | 104/104/ 109% PREDICTED: 100/104.5/104.5/ 72/104.5 ACTUAL: 100/104.5/100// 72/104.5 1 = 2052 (8) 2 = 2051 (9) 3 = 2047 (13) M 3 EOM: WEIGHT: 222200 LBS X CG: 1088.4 IN LANDING: WEIGHT: 222271 LBS X CG: 1090 IN | BI-139 RSRM 107 ET-132 SLWT 36 ET IMPACT 1:14:26 MET LAT: 35.875 S LONG: 157.761 W | 51.6 (30) | DIRECT INSERTION POST OMS-2 127.5x84.4 NM DEORBIT: HA 192.1 NM HP 22.5 NM ENTRY VELOCITY: 25863 FPS ENTRY RANGE: 4399.1 NM | OI-34 (1) | CARGO: 40605LBS PAYLOAD CHARGEABLE: 33056 LBS DEPLOYED: 30572 LBS NON-DEPLOYED: 2331 LBS MIDDECK: 153 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 1579270 LBS NON-DEPLOYED: 1623992 LBS CARGO TOTAL: 4131080 LBS PERFORMANCE | Brief Mission Summary: The STS-128 (30th mission to ISS), dubbed "Racking Up New Science" by PAO, main objective was to deliver science and environmental racks to dramatically enhance the scientific capability of the ISS. These racks were carried in the Leonardo MPLM. Included in the cargo was the highly publicated Combined Operational Load Bearing External Resistance Treadmill (COLBERT) named after TV comedian Stephen Colbert. Three EVA's were conducted and included replacement of the massive ammonia tank used by the ISS Thermal Control System. KSC W/D OPF: 117+ 2H VAB: 9+0C PAD A: 25+0C Total Work Days = 151 (OPF processing occurred over a total time period of 119 days.) POSTPONEMENTS: - Added STS-128 to FDRD - launch date of 07/30/09 on 06/23/08 Ppd. to 08/06/09 on 12/10/08. Interim manifest while HST final placement is considered Ppd. to 08/07/09 on 06/08/09. Slip due to MA direction Ppd. to 08/07/09 on 06/30/09. Slip due to STS-127 GUCP delays Ppd. to 08/25/09 on 08/20/09. Slipped to support KSC processing. LAUNCH SCRUBS: |
| MSRR MELFIZ EUTEF FIR N3 ARS | MISSE 6A & 6B CQ ATA ZSR 1-2 | MS 5 UP Stay ISS EXP20/FLT ENG Nicole Stott P808/R347/F47 MS 5 DN EXP 20 FLT ENG Tim Kopra Up on STS-127 stay ISS) P809/R344/M298 Continued | 752.76 (P) 738.70 (A) <u>SRB STG</u> : 2:02.2 (P) 2:02.6 (A) <u>PERF</u> : NOMINAL <u>2 ENG TAL (MRN)</u> : 2:38 (P) 2:41 (A) <u>NEG MRN (2@ 104)</u> : 3:52 (P) 3:53(A) <u>PTA (U/S 157 FPS)</u> : 5:09(P) 5:12(A) Continued | NLGTD: 4854 FT 255:00:53:29Z VEL: 185 KGS 161 KEAS HDOT: -6.3 FPS BRK INIT: 113 KGS DRAG CHUTE JETTISON: 54 KGS 255:00:54:06Z BRK DECEL FPS ² : AVE 4.8 PK 7.4 Continued | Banana River toward Earth o launch #33. | Viewing Site | , the Sp | Jiewed from the bace Shuttle hear swith ISS. Night | | MARGINS (LBS): FPR: 2908 FUEL BIAS: 1059 FINAL TDDP: 1707 RECON: 2077 PAYLOADS: PLB: ISS-17A (MPLM,LMC), MISSE 6, TRIDAR AR&D SENSOR,DTO- 701A Continued | - 08/25/09 weather did not cooperate, systems looked good. Setting up for the next opportunity, window open at 12:05am CDT tomorrow with the in-plane time at 12:10am. Weather Scrub. - 08/25/09 the 2nd launch attempt was scrubbed officially at 4:52 p.m. CDT (5:52 Eastern) by Launch Director Pete Nickolenko due to stuck "fill & drain valve during ET loading. Based on the results of a technical review of the MPS Hydrogen Fill & Drain Valve data, a 48 hour scrub turnaround was initiated. Technical scrub. - 08/27/09 Official no go for launch today. Launch postponed to allow engineers additional time to develop flight rationale based on testing of F&D valve. Moses, "Will try tomorrow night if we get there." Next opportunity is Friday at 10:59 pm CDT (11:59 Eastern). - 08/28/09 MMT Summary at 12:55 PM: Reviewed LH₂ valve (PV12) and agreed to plan for tonight's launch attempt. MMT is go to proceed for launch. Continued |

| | | | | SP | ACE SH | JTTLE I | MISS | SIO | NS SU | MM | IARY | Page 2-214 - STS-128/17A |
|---|------------|---|-----|---|--|---|--------------------|-------|----------------|-------------|--------------------------------------|---|
| FLT NO. | ORBITER | CREW (6+1 UP/6+1 DN) | LIF | INCH SITE, TOFF TIME, DING SITES. | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES | SSME-TL NOM-ABORT EMERG THROTTLE | SRB RSRM AND | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, |
| NO. | | TITLE, NAMES & EVA'S | | ORT TIMES | FLT DURATION, WINDS | ET | IIVC | ПА/ПР | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) | |
| STS-128 (17A) Continued | | SPECIAL EDUCATOR "Buzz" Lightyear (DN/EXP 20, see below left) | | lights over | /eather scrubs launch Launch Pad 39A con rike. Photo source: I | npete with the | | 1 | A | | | Continued LAUNCH WINDOW: Total launch window was 9M 36S with window open at 241:03:54:49Z and close at 241:04:04:25Z. Preferred Launch Time was 241:03:59:37Z (In-Plane Time) for a launch window of 4M 48S. |
| At FRR News Conf: News 13 Flordia: "Buzz Lightyear doing okay?" Suffredini: "There are big plans for | | SS EVA 142 DOCKED QUEST EVA 60 EMU/TETHERED EVA 135 SCHEDULED EVA 133 DURATION 6:35 | | | | | | | | | | LAUNCH DELAYS: - None. Launch occurred on time at 241:03:59:37Z, 11:59:37 PM EDT, Friday, August 28, 2009. The Spaceflight Meteorology Group (SMG) gave a "Go" for weather. |
| stowed, se | o I didn't | SS EVA 143 DOCKED QUEST EVA 61 FMI/TETHERED EVA 136 | | | | | | | | | | TAL WEATHER: SMG Forecast: A frontal system is approaching Istres and a upper level shortwave is dropping into northern Spain and southern France. Result in very windy conditions at Istres and |

EMU/TETHERED EVA 136 SCHEDULED EVA 134 DURATION 6:39

SS EVA 144 DOCKED QUEST EVA 62 EMU/TETHERED EVA 137 SCHEDULED EVA 135 DURATIO N 7:01

MCC WHITE FLIGHT FCR (58)



FLIGHT DIRECTORS: SHUTTLE:

A/E- Richard Jones LD/O1- Tony Ceccacci O2- Kwatsi Alibaruho Planning- Gary Horlacher MOD – John Mccullough Team 4- Mike Sarafin

O1 - Ron Spencer

LD/O2 – Heather Rarick O3 – Royce Renfro Team 4 - Derek Hassmann

Continued...

SE TAL (FMI 104): 6:05(P)

6:09(P)

SE PRESS 104 6:57(P)

MECO CMD: 8:24.0(P) 8:24.7 (A) 25819(P) 25820(A)

Continued...

Continued...

6:08(A)

PTM (U/S 181 FPS): 6:16(A)

6:58 (A)

Continued...

<---- Water Tower Strike

Google Earth Plots of StrikeNet and CGLSS Coordinates.

From: Aug 15, 2009 Daily PRCB, John Apfelbaum/KSC PHI10

MIDDECK: ISS-17A,MAUI, SEITE,SIMPLEX

5 CRYO TANK SETS ODS, SRMS (85), OBSS.SSPTS

and southern France. Result in very windy conditions at Istres and breezy conditions at Zaragozal. Istres winds will be violating flight rule limits while Zaragoza will be very near the headwind limit. Moron weather is looking very favorable with clear skies and relatively light winds.

PERFORMANCE ENHANCEMENTS:

Include the standard set plus: 1) PE Operational High Q -SUM/AUG, 2) OMS Assist, 3) a 52 nautical mile MECO, and 4) Del Psi

FLIGHT DURATION CHANGES:

Thursday, Sep 10, 2009, first deorbit opportunity waved off for violations of showers within 30nm & crosswind violations at 17 kts. Second opportunity also waved off; showers, instability, broken cloud deck and crosswind violation. Flight extended for EOM +1 day to Friday, 4 opportunities available. First & second opportunities at KSC were again waved off due to weather. EDW had no violations and low winds, first opportunity shows winds 230 8p12 kts. GO for EDW given. Landed on EDW Runway 22 at 255:00:53:20Z, Friday, Sep 11, 2009.

RSRM Improved Resiliency O-rings, Nozzle-to-Case Joint. Fly with higher margins.

RSRM Inactive Stiffener Stub Removal - Eliminated four debris liberation/debris impact causes

NIGHT LAUNCH: #33

| FLT | ORBITER | CREW (6+1 UP/6+1 DN) | LAUNCH SITE, LIFTOFF TIME, | CROSSRANGE | | RSRM | | RBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|------------------|---------|---|--------------------------------------|--|----------------------------------|-----------|-----|----------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | IC HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-128 (17A) | | Continued CAPCOMS: SHUTTLE A/F. Frie Dec | Continued OMS-2: 39:00 (P) 39:00(A) | Continued <u>WHEELS STOP</u> : 255:00:54:33Z | | Į | 1 | | | | Continued RENDEZVOUS: #75 Rendezvous and dock with ISS. |

39:00 (P) 39:00(A) 255:0 95.1(P) 94.5(A) FPS 13109 FT A/E – Eric Boe - Chris Ferguson (Wx) LD/O1 - Chris Ferguson - Tony Antonelli O2 - Stan Love Planning - Shannon Lucid Team 4 - N/A ISS O1 - Chris Zajac LD/O2- Robert Hanley O3 – Mike Jensen Team 4 - N/A

Continued..

Construction and maintenance continued on the ISS.

ABOVE: S128-E-007229 (1 Sept. 2009) --- Nicole Stott/EXP 20 FE, during EVA 1 with Danny Olivas/MS3 (out of frame). Activities included removal of an empty ammonia tank from ISS

BELOW: S128-E-007720 (5 Sept. 2009) --- Olivas/MS3 (left) & Christer Fuglesang//ESA/MS4, participate in EVA3 activites.



OV-103: 332:00:33:34: DISTANCE: 5.702.716 sm

ROLLOUT:

1:13 M:S

-6.5T KT

-2.5L KTS

5489 FT

13:20:53:43

11594 FT

WINDS:

OFFICIAL:

DENS ALT:

S/T:

09007P08KT

(X4P4 T6P7)

FLT DURATION:

1225:22:25:27

TOTAL SHUTTLE DISTANCE: 503.104.934 sm

In the JSC MCC: JSC2009-E-155032 --- FDs Richard Jones (left) & Tony Ceccacci on console during 2nd launch attempt. The launch was later postponed due to a valve issue in Discovery's main propulsion system. FD Bryan Lunney is in the background.

- FD1: OMS2 ignition at 241:04:38:36.9Z resulted in a 127.5 by 84.4 nm orbit.
- FD2: RCC inspection found no areas of concern
- T1 maneuver at 242:22:26:17Z resulted in a 193.2 by181.6 NM
- FD3: R-Bar Pitch Maneuver was performed. No issues.
- Docking Contact occurred at 243:00:53:56Z
- Hard Dock, hooks closed, occurred at 243:01::07:23Z
- ISS Hatch opened at (9:32 PM CDT, Aug 30, 2009) welcomed by ISS crew.
- IELK Seat Liner Transfer at (10:50 PM CDT, Aug 30). At that time Tim Kopra became a member of STS-128 and Nicole Stott joined ISS EXP 20.
- MMT FD3 reported VRCS jet F5R experienced a jet fail leak at 00/4:37 MET. ISS to perform all attitude control & maneuvers during the docked mission.
- MMT FD5 concurred that no Focused Inspection of Orbiter was required.
- · FD5: "Leonardo" MPLM transferred to ISS, Zero-G stowage rack t 'Harmony" node & COLBERT treadmill transferred.
- EVA 1: Olivas & Stott successfully completed: Prep of P1 truss Ammonia Tank Assembly (ATA) for removal, EuTEF & MISSE experiment removal from Columbus module. EVA1 duration 6:35.
- FD7: EVA2: Olivas & Fuglesang: EVA was about 51 min late due to Olivas' comm. cap chin strap came undone while in prebreathe. The ATA task was completed early & 3 get ahead tasks were completed: CLA cover installation, APFR 4 tool stanchion relocation, & CLPA cover installation. EVA2 duration 6:39.
- FD9: EVA3: Olivas & Fuglesang: Activities included: Deploy S3 Truss Payload Attach System, Rate Gyro Assembly 2 R&R, S0 Truss Remote Power Control Unit R&R, Global Positioning System 4 installation, "Tranquility" Node 3 avionics cable routing (full), & Oxygen Generator Assembly water filter R&R. A lens became mechanically detached from Fuglesang's helmet at the end of the EVA. Without intact helmet lights he headed to the A/L before sunset. His PET was 6:22. Olivas performed cleanup. EVA3 duration (PET) 7:01.

| FLT NO. | ORBITER | CREW (6+1 UP/6+1 DN) TITLE, NAMES & EVA'S | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS | SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N. | SRB RSRM AND ET | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) | |
|------------|---------|--|--|---|---|--------------------------|-----|----------------|-----|---|---|--|
| STC-128 | | | | Continued | | | | | | | | |

313-128 (17A)

Continued.

\$128-E-009998 (8 Sept. 2009) --- Back-dropped by Earth's horizon and the blackness of space, ISS as seen from Discovery as the two spacecraft begin their relative separation.



STS128-S-047 (11 Sept. 2009) --- Shuttle Discovery's main landing gear touchdown at EAFB. Landing was diverted from KSC due to marginal weather.



ISS020-E-038322 --- STS-128 & Exp 20 crew inflight portrait on ISS. STS-128 red-clad crew are: front row, from left, CDR Sturckow, Hernandez, & Forrester; middle row in red, PLT Ford, Olivas, & Fuglesang (ESA). EXP 20 crew (in blue) are: bottom left, Kopra, who joined ISS crew in July, now scheduled to return to Earth with STS-128. Clockwise from him are: Stott, Robert Thirsk/CSA, Roman Romanenko/RSA. Frank De Winne/ESA. Gennady Padalka/RSA, and Michael Barratt.



Transfers:

- 18.548 Lbs of hardware transferred to ISS
- 1,705 Lbs "New" ATA (with 600 lbs of ammonia) to ISS
- 1,295 "Old" ATA to Discovery
- 5,223 Lbs hardware returned to Discovery
- 1.705 Lbs of middeck items transferred to ISS
- 861 Lbs of middeck items returned from ISS to Discovery
- 1,243 Lbs of water transferred to ISS
- 710,966 Mass in space of the ISS (lbs)
 - 84 Percentage complete of ISS assembly
- FD12: Undocked at 251:19:26:22Z
- During Entry comm blackout occurred at 255:00:38:39Z -255:00:39:02Z due to plasma effect. FD15: Deorbit burn on orbit 219 for EDW landing.

SIGNIFICANT ANOMALIES:

- EV2 UNACCEPTABLE COMM DURING EVA 2.
- Vernier Thruster F5R Indicates Leak In Flight
- APU 3 EGT 2 R&R
- Vernier Thruster F5R Indicates Leak In Flight
- HANDLES ON BULK HEAD PLATES ARE LIBERATING
- STS-128 Post Launch Debris

- DEBRIS OBSERVED NEAR HOLD DOWN POST (HDP-4) DURING ASCENT.
- RH MAIN CHUTE CANOPY DAMAGED WITH A VERTICAL TEAR EXTENDING FROM THE TOP VENT BAND TO THE CANOPY BOTTOM SKIRT BAND DURING STS-128 ON BI-139 RSRM: None.

SSME: None.

- STS-128/ET-132 REVIEW SHOWED FOAM LOSS BETWEEN +Y JACKPAD/-Y BIPOD CLOSEOUTS AT LH2/IT FLANGE MOD: None.

Integration:

- LH₂ PV-12 Inboard Fill and Drain valve did not indicate closed when commanded
- Debris Observed Near RH SRB Aft Skirt HDP #4 Foot
- LH₂ PV-12 Inboard Fill and Drain valve did not indicate closed when commanded

| | | | | LANDING SITE/ | SSME-TL | | | | | | | |
|--|--|---|--|--|---|---|-----------------------------|---|-------|---|---|--|
| | | CREW (6 UP/6+1 DN) | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS | |
| FLT | ORBITER | (0 UP/0+1 DIN) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, | |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, | THROTTLE PROFILE | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) | |
| | | | | WINDS | ENG. S.N. | | F1 / | DIDECT | 01.24 | | | |
| STS-129/ ULF3 SEQ FLT # 129 KSC-129 PAD 39A (52) MLP-3 31th SHUTTLE FLIGHT TO ISS | OV-104 (Flight 31) ATLANTIS OMS PODS LP04-30 RP01-38 FRC4-31 | CDR: Charles O. Hobaugh (Fit 3 - STS-104, STS-118) P810/R268/V188/M234 PLT Barry E. Wilmore P811/R348/M301 MS 1 Leland Melvin (Fit-2 - STS-122) P812/R319/V209/M275 MS 2 Randy Bresnik P813/R349/M302 MS 3 Mike Foreman | Monday (15) 11/16/09 (15) LAUNCH WINDOW: 9M 01S (Total) 4M 28S (Preferred) EOM PLS: KSC TAL: ZZA TAL WX: MRN, FMI (Cloud Ceiling) SELECTED: RTLS: KSC33N/N TAL: ZZA 30L N/SFD AOA: KSC 33 N/N | 331:14:44:20Z VEL: 184 KEAS 197 KEAS HDOT: -2.1 FPS TD NORM 195: | 104/104/ 109% PREDICTED: 100/104.5/104.5/ 72/104.5 ACTUAL: 100/104.5/100/ 72/104.5 1 = 2048 (10) 2 = 2044 (12) 3 = 2058 (4) | BI-140 RSRM 108 ET-133 SLWT 37 ET IMPACT 1:14:13 MET LAT: 36.434 S LONG: 158.531 | 51.6 (31) | DIRECT INSERTION POST OMS-2 125.0x84.8 NM DEORBIT HA 191.9 NM HP 23.3 NM ENTRY VELOCITY: 25867 FPS ENTRY RANGE: 4390.31 NM | (2) | CARGO: 38893LBS PAYLOAD CHARGEABLE: 29372 LBS DEPLOYED: 27615 LBS NON-DEPLOYED: 1404 LBS MIDDECK: 353 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: | Brief Mission Summary: The STS-129 (31th mission to ISS), dubbed "Stocking the Station" by PAO, main objective was to deliver nearly 14 tons of ISS systems spares. The most critical spares being transferred were two 600 lb. control moment gyros. "They've done a tremendous job of really outfitting station with all the spares that are going to be needed, essentially through its lifetime," Bill Gerstenmaier, NASA Associate Administrator for Space Operations. KSC W/D OPF: 113 days + 10 non-workdays + 1 holiday VAB: 7 days + 1 contingency day PAD A: 32 days + 2 contingency days Total Work Days = 152 (OPF processing occurred over a total time period of 124 days.) POSTPONEMENTS: - Baselined STS-129 to FDRD - launch date of 10/15/09 on 10/06/08 Ppd. to 11/12/09 on 12/04/08. Interim manifest while HST final placement is considered. | |
| Ž. a | | (Fit 2 -STS-123) P814/R324/V210/M280 MS 4, EV2 Robert Satcher, Jr. P815/R350/M303 MS 5 DN EXP20/21 FLT ENG | TST DAY PLS: EDW 22L N/N TDEL: 0.000 (P) -0.072 (A) MAX Q NAV: 760.9 (P) 733.8 (A) | 2989 FT DRAG CHUTE DEPLOY: 189 KEAS 331:14:44:24Z Continued | LANDING: WEIGHT: 207200 LBS X CG: 1084.6 IN | NASA rocket la as STS- | A's nev iunche 129 re | 15 (28 Oct. 200 v Ares I-X test s from PAD 39 adies for Nov. PAD 39A. | В | 1606885 LBS NON-DEPLOYED: 1625396 LBS CARGO TOTAL: 4131080 LBS PERFORMANCE | - Ppd. to 11/16/09 at10/29/09 FRR. Slip due to latest SSP planning. LAUNCH SCRUBS: None. LAUNCH WINDOW: Total launch window was 9M 01S with window open at 320:19:23:37Z and close at 320:19:32:38Z. Preferred Launch Time was 320:19:28:10Z (In-Plane Time) for a | |
| The state of the s | | SS EVA 145 DOCKED QUEST EVA 63 EMU/TETHERED EVA 138 SCHEDULED EVA 136 DURATION 6:37 SS EVA 146 DOCKED QUEST EVA 64 EMU/TETHERED EVA 139 SCHEDULED EVA 137 DURATION 6:08 | SRB STG: 2:03.0 (P) 2:04.0 (A) PERF: NOMINAL 2 ENG TAL (ZZA): 2:36 (P) 2:43 (A) NEG ZZA (2@ 104): 3:52 (P) 3:57(A) PTA (U/S 157 FPS): 5:08(P) 5:09(A) SE TAL (ZZA 104): 5:57(P) 6:13(A) | | NOTE: Ares Progra | | | 10. | | MARGINS (LBS): FPR: 2908 FUEL BIAS: 1059 FINAL TDDP: 2228 RECON: 2041 PAYLOADS: PLB: ISS-ULF3 (ELC 1, ELC 2, SASA, MISSE 7A, MISSE 7B) Continued | launch window of 4M 28S. LAUNCH DELAYS: None. Launch occurred on time at 320/19:28:10Z, 2:28:10 PM EST, Monday, November 16, 2009. A cloud ceiling below 5000 feet developed early in the morning, violating flight rule limits. The ceiling lifted to above flight rule limits about 5 hours prior to launch, but continued to violate US Air Force Range Safety cloud criteria. Astronaut Steve Lindsey, flying weather reconnaissance, provided measurements of the cloud thickness for the 45th Space Wing's Launch Weather Officer and found the thickness to be acceptable about 3 hours prior to launch (Courtesy NWS SMG Post-Mission Summary.) Continued | |

| | | | | <i>-</i> 10 – 0111 | | | | | | ., | |
|-----------|---------|---|---|--|--|-------------|-------------------|--|--|---|---|
| | | CREW | LAUNCH SITE. | LANDING SITE/ RUNWAY. | SSME-TL NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (6 UP/6+1 DN) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | ONDIT | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| 272 1221 | | | Continued | WINDS | ENG. S.N. | | | | | Continued | Continued |
| STS-129/ | | Continued | Continueu | Continued | | | - | | 1500 | Continued | |
| ULF3 | | SS EVA 147 | PTM (U/S 181 FPS): | BRK DECEL FPS2: | | | | | | PAYLOADS: | TAL WEATHER: Weather on launch day caused a couple minor |
| Continued | | DOCKED QUEST EVA 65 | 6:11(P) 6:13(A) | AVE 6.4 PK 7.9 | Para | | | - | | MIDDECK: | issues at back-up site, Istres. Weather conditions at Zaragoza, |
| | | EMU/TETHERED EVA 140 | CE DDECC 104 | | | . | | | | ISS-ULF3, MAUI, SEITE, | the prime TAL site, and Moron were observed and forecast acceptable throughout the countdown. However, a cloud ceiling |
| | | SCHEDULED EVA 138 | <u>SE PRESS 104</u> 6:56(P) 6:56 (A) | NLGTD: 5810 FT | G. Control | | 0 | | | SIMPLEX, | developed at Istres 2 hours prior to launch limiting the use of that |
| | | DURATION 5:42 | 0.00(1) | 331:14:44:30Z VEL: 140 KGS | | 5 1 6 | 60 | | | RAMBO-2 | landing site. (Courtesy NWS SMG Post-Mission Summary.) Istres |
| | | | MECO CMD: | 150 KEAS | | | W | 110 | | | became GO close to launch update. |
| | | | 8:24.2(P) 8:24.3 | HDOT: -5.1 FPS | | | W. | | | 5 CRYO TANK | DEDECOMANOE ENLIANGEMENTO |
| | | | (A) | | 100 | | East | | | SETS ODS, SRMS (86), | PERFORMANCE ENHANCEMENTS: Include the standard set plus: 1) PE Operational High Q - |
| | | | VI: | BRK INIT: 100 KGS | | | 1 10 | | | OBSS (60), | TRN/NOV, 2) OMS Assist, 3) a 52 nautical mile MECO, and 4) Del |
| | | | 25819(P) 25819(A) | DRAG CHUTE | | - Car | | | | | Psi |
| | ISS | 1(| | JETTISON: | | 1 | | | ************************************** | | |
| Pas | XXI | A \ | OMS-2: 37:55 (P) 38:15(A) | 51 KGS 331:14:44;25Z | | 16 | | | | | FLIGHT DURATION CHANGES: None. Landed on KSC Runway 33 at 331:14:44:21Z, Friday, |
| | | | 98.8(P) 96.7(A) | 331:14:44;252 | | 0 | | | | | November 27, 2009, at8:24:21 CST. |
| | | | FPS | BRK DECEL FPS2: | | | | - | | | ,, |
| | | | | BRK DECEL FPS ² : AVE 6.4 PK 7.9 | STS129-S-02 | 27 (16 No | v. 200 pitor A | 9) NASA tlantis launch | in | | FIRSTS/SECONDS/LASTS: |
| | | | | WILLEL O OTOD | KSC FR 4 | Rill Gerste | enmaie | er, NASA Ass | 00 | | Second child born while astronaut dad in space. Randy Bresnik's wife, Rebecca, gave birth to Abigail Mae Bresnik, 6 lbs 13 oz, at |
| | | | | WHEELS STOP: 331:14:45:04Z | Administrato | r for Spac | e Ope | rations is at | | | 11:04 p.m. Saturday, Nov. 21st, in Houston. First "dad while in |
| | | | | 9557 FT | bottom left. | Photo Cre | dit: N | ASA/Bill Ingall | s. | | space" was Mike Fincke in 2004 on ISS during a 6 mo tour- a girl. |
| | | MCC WHITE FLIGHT FCR | | ROLLOUT: | | | MAR TO THE | | | SERVICE CONTROL OF | First Orthopedic Surgeon in space: Dr. Robert Satcher, Jr. |
| | | (59) | | 6586 FT | | | | all ale | | 31/ | First flight of new variable Alt DAP First flight ET replaced LH2 ice Frost Ramp (IFR) base TPS with |
| | | FLIGHT DIRECTORS: | | 0:44 M:S WINDS: | | The same | | | TWO. | No. | NCFI at 14 locations |
| | | SHUTTLE: | | 11H KTS -1L KTS | | | | | | | First Flight SSME Nozzle Corrosion Inhibitor Application Change |
| | | A/E- Bryan Lunney | | OFFICIAL: | | | Marie Control | | Ch. | | First Monarch Butterflies delivered to ISS. Butterflies took flight on |
| | | LD/O1- Mike Sarafin | | 33011P17KTS | | No. | 4 | | | Attentis | 12/09/09 as monitored by thousands of students back on Earth. |
| | | O2- Gary Horlacher Planning- PaulDye | | (X1P2H11P17) | | | | 12- | 70 1 | | Super Bowl XLIV opening-toss coin flown to ISS & returned. |
| | | MOD – John Mccullough | | <u>DENS ALT</u> : - 473 FT | | | | CHE BY | 3 | | NIGHT LAUNCH: N/A |
| | | Team 4- Kwatsi Alibaruho | | ELT DUDATION. | | | | | | | |
| | | <u>ISS</u> | | FLT DURATION: 10:19:16:14 | | 7 | | | ****** | The second | RENDEZVOUS: #76 Rendezvous and dock with ISS. |
| | | O1 - Emily Nelson | | <u>S/T</u> : | | / | | | | 87 | EVENTS: |
| | | LD/O2 – Brian Smith | | 1236:17:41:41 | | | | | | | - FD1: OMS2 ignition at 320:20:06:25Z resulted in a 125.0 by 84.8 |
| | | O3 – Jerry Jason | | OV-104: 281:23:59:12 | | - | 1 | | | | NM orbit. |
| | | Team 4 - Heather Rarick | | 281:23:59:12 DISTANCE: | Manager of the Control of the Contro | 3.00 | 1 | The state of the s | | * | - FD2: RCC inspection found no areas of concern - T1 maneuver at 322:14:05:57Z resulted in a 185.6 by179.5 NM |
| | | | | 4,490,138 sm | ISS021-F-0 | 29824 (1 | 18 No | v. 2009) | Atlan | tis loaded | orbit |
| | | | | TOTAL SHUTTLE | | | | ned on appro | | | - FD3: R-Bar Pitch Maneuver was performed. No issues. |
| | | Continued | | DISTANCE: | | | | per. The Ru | | | - Docking Contact occurred at 322:16:51:16Z |
| | | | | 507,595,072 sm | 35P spaced | | | | | | Continued |
| | | | 1 | T. Control of the Con | | | | | | | Continuou |

| OTO 4001 | | Continued | | | | | | | | | Continued |
|----------|---------|---------------|----------------|---------------|-----------|------|-----|-------|-----|-------------|--------------------------------------|
| | | & LVA 3 | | WINDS | ENG. S.N. | | | | | | |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| FLT | ORBITER | (6 UP/6+1 DN) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| | | CREW | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| | | 005111 | | LANDING SITE/ | SSME-TL | | | | | | |

STS-129/ ULF3 Continued.

Continued...

CAPCOMS:

SHUTTLE A/E - Chris Ferguson - Steve Frick (Wx) LD/O1 - Stan Love O2 - Megan McArthur Planning - Aki Hoshide Team 4 - N/A <u>ISS</u>

O1 - Drew Feustel LD/O2- Steve Swanson O3 – Ryan Lien Team 4 - N/A



ISS021-E-032724--- (24 Nov. 2009) Portrait Time: Twelve internationally-represented astronauts and cosmonauts spend time together in space. The group includes the seven STS-129 astronauts CDR Hobaugh, PLT Wilmore: & Mission Specialists Stott, Foreman, Melvin, Satcher, & Bresnik, plus the five ISS crewmembers; Jeffrey Williams, Frank De Winne/ESA, Robert Thirsk/CSA and Russia's FSA Roman Romanenko & Maxim Suraev.

SPACEMEN AT WORK ------



ISS021-E-030165 (19 Nov. 2009) Foreman installing a spare S-band antenna structural assembly to the Z1 segment of the station's truss. EVA 1.



S129-E-007762 " New Dad In Space", Bresnik, installing a Grappling Adaptor to On-Orbit Railing Assembly (GATOR) on Columbus Lab. EVA 2. (21 Nov. 2009)



S129-E-008103 (23 Nov. 2009) Satcher moves debris shields from Quest airlock to the External Stowage Platform #2. EVA 3.

Continued

EVENTS: Continued

- Hard Dock, hooks closed, occurred at 322:17:03:49
- ISS Hatch opened at 12:28 PM CST. Nov. 18, 2009, welcomed by ISS crew. At that time Stott ended her stay as EXP 21 FE and became an STS-129 MS.
- FD4: EVA 1: Foreman & Satcher successfully completed all ISS maintenance and spares transfer tasks ahead of schedule. A getahead task was the most difficult. In releasing a cargo platform, a spring loaded device jammed and had to be manhandled to achieve release. EVA1 duration 6:37.
- MMT concurred that no Focused Inspection of Orbiter was
- FD6: EVA2: Russian false depress event overnight, but EVA2 was conducted on time. Foreman & Bresnik completed all nominal tasks plus the following get-aheads: S3 Nadir/Inboard PAS Deploy, SGANT Y-cable check (CHIT 8025), Tool stanchion relocation to P1 WIF 3, & APFR 5 retrieve. EVA2 duration 6:08.
- FD8: EVA3: Satcher & Bresnik: EVA-3 started one hour late due to EV2's drink bag valve coming loose. All tasks successfully completed included: transfer of HPGT & MISSE & from ExPRESS Logistics Carrier 2 to Quest airlock. Towards the end of the EVA two [unknown] items were lost overboard at 327:17:37Z. All tools were accounted for. EVA3 duration (PET) 5:42.
- Hard Dock, hooks closed, occurred at 322:17:03:49
- ISS Hatch opened at (12:28 PM CST., Nov. 18, 2009) welcomed by ISS crew. At that time Stott ended her stay as EXP 21 FE and became an STS-129 MS.

-Transfers:

- 31,789 Pounds of hardware transferred to station (inside & out) 40 Pounds of Oxygen "transferred" (pumped) into ISS cabin
 - 11 Pounds of Nitrogen transferred into ISS tanks
- 2,211 Pounds of middeck items delivered to ISS
- 2,110 Pounds of middeck items returned from ISS
- ~1,400 Pounds of water transferred to ISS
- Mass in space of the ISS 759,222 pounds
- ISS assembly: 86 Percentage complete
- FD10: Undocked at 329:09:53:02Z
- During Entry there was no RF blackout. It was avoided by a handover to the Eastern TDRS early, then a handover to the ground station.

| FLT | ORBITER | CREW (6 Up/6+1 DN) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE FNG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |

STS-129/ ULF3 Continued.



S129-E-009497 (24 Nov. 2009) --- Nicole Stott/MS takes one of her final "strolls" through the ISS modules on the eve of her departure from the orbital outpost.

JSC2009e240939 --- In MCC. Tim Oram with the Space Flight Meteorology Group gathers data for weather forecast.



JSC2009-E-244757 ---In MCC, Joshua Byerly/PAO narrates mission post undocking activities.





S129-E-009228 (25 Nov. 2009) --- ISS, post Shuttle sep, is shown against the background of Earth's horizon and the blackness of space.



JSC2009-E-243548--- The members of the STS-129 Ascent Flight Control Team pose for a group portrait in MCC at JSC. Flight Director Bryan Lunney and Flight Controller Christi Worstell hold the STS-129 logo.

Continued...

SIGNIFICANT ANOMALIES:

- WASTE DUMP STOPPED PREMATURELY. THE WASTE WATER DUMP INITIATED POST-UNDOCK AT APPROX. 329/12:07:38 GMT, EXHIBITED A NOMINAL WASTE DUMP RATE (APPROX. 2.0 %//MIN) UNTIL APPROX. 329/12:19:36 GMT WHEN THE WASTE DUMP RATE DEGRADED TO 0.3/ %/MIN. WASTE DUMP WAS TERMINATED BY CLOSING THE DUMP VALVE AND NOZZLE WAS REHEATED TO APPROX. 258 DEG F. DUMP VALVE WAS THEN OPENED AT 329/12:35:34 GMT FOR CONTINUATION OF THE DUMPING OPERATION. THE OBSERVED DUMP RATE CONTINUED OFF-NOMINALLY AT NEAR 0 %/MIN AND THE WASTE DUMP WAS TERMINATED AFTER 19 MINUTES. This IFA is considered a constraint to STS-132/ULF4 (next flight of OV-104), but is expected to be resolved with a dump line filter change.

- APU water tank heater A (50V46HR01A) did not operate at expected temp. APU water tank temp - LRCS BFS FUEL AND OXIDEZER QUANTITIES INCREASED
- OFF NOMINAL

KSC: None.

SRB:

RH SOLID ROCKET BOOSTER AFT SKIRT FOAM ON THE OUTBOARD SIDE OF HOLDDOWN POST M2 NEAR THE GN2 PURGE LINE IS OBSERVED TO CRACK DURING LIFTOFF RSRM: None.

SSME: None.

ET: None.

MOD: None.

Integration:

- Unexpected Debris/Expected Debris Exceeding Mass Allowable Prior to Pad Clearance (Liftoff Debris)
- Single Transient SRB I/O Error at Liftoff

| | | CREW | LAUNCH CITE | LANDING SITE/ | SSME-TL | CDD | | ODDIT | | DAVLOAD | MICCION HIGHE IGHTS |
|---------------------------|------------------------------------|---|--|--|----------------------------------|-------------------------------|--------------|--------------------------------------|--------------|---|---|
| FLT | ORBITER | (6) | LAUNCH SITE, LIFTOFF TIME, | RUNWAY, CROSSRANGE | NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | ORBITER | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | 1011 | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, | PROFILE | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-130/ 20A | OV-105 (Flight 24) ENDEAVOUR | CDR: George D. Zamka (Flt 2 - STS-120) | KSC 39A 39:09:14:07Z | WINDS KSC15 KSC (73) 053:03:20:29Z | ENG. S.N. 104/104/ 109% | BI-141 | 51.6 (32) | DIRECT INSERTION | OI-34 (3) | CARGO: 40956 LBS | Brief Mission Summary: The STS-130 (32nd mission to ISS) main objectives were to deliver and assemble the final U.S. module (Tranquility) and the Italian built Cupola Node plus |
| | | (Fit 2 - STS-120) P817/R315/V211/M271 PLT | 4:14:07 AM EST (P) 4:14:07 AM EST (A) Monday (16) | 9:20:29 PM CST Sunday (17) | PREDICTED: 100/104.5/104.5/ | RSRM 109 | | POST OMS-2 124.0x110.08 NM | | <u>PAYLOAD</u> <u>CHARGEABLE</u> : | delivery of ISS equipment, supplies, and experiments. Tranquility provides additional room for the ISS crew and life support systems. The Cupola is a robotic control station and |
| SEQ FLT # 130 | OMS PODS LPO3 -34 RPO4 30 | Terry W. Virts, Jr. P818/R351/M304 | 02/08/10 (10) LAUNCH WINDOW: | 02/21/10 (8) DEORBIT BURN: | 72/104.5 ACTUAL: | ET-134 SLWT 38 | | | | 34931 LBS DEPLOYED: | provides a panoramic view of earth through 7 windows, "A Room With a View" - PAO. The mission included 3 EVA's. |
| KSC-130 PAD 39A | FRC5-23 | MS 1 Kathyrn P. Hire (Flt 2 - STS-90) P819/R238/V212/F31 | 11M 57S (Total) 7M 32S (Preferred) | 053:02:14:47Z XRANGE: 336.9NM | 100/104.5/100/ 74/104.5 | 30 | | DEORBIT HA 190.3 NM HP 23.3 NM | | 34648 LBS | KSC W/D OPF-2: 130 days + 3 holidays VAB-1: 9 days + 5 contingency days +11 holidays |
| (53) | | MS 2 Stephen K. Robinson | EOM PLS: KSC TAL: ZZA | ORBIT DIR: A/L (44) | 1 = 2059 (4) 2 = 2061 (1) | ET IMPACT | | ENTRY VELOCITY: | | NON-DEPLOYED: 0 LBS | PAD A: 31 days + 3 contingency days Total Work Days = 170 (OPF processing occurred |
| MLP-2 | | (FIt 4 - STS-85, STS-95, STS-114) P820/R222/V152/M196 | TAL WX: MRN (NO GO), FMI (NO GO) | AIM PT: (Close-In) MLGTD: 2760 FT | 3 = 2057 (5) <u>M 3 EOM</u> : | 1:13:54 MET | | 25866 FPS | | MIDDECK: 283 LBS | over a total time period of 133 days.) POSTPONEMENTS: |
| 32nd SHUTTLE FLIGHT | | MS 3 Nicholas J. M. Patrick (Flt 3 - STS-105, STS-116) | SELECTED: RTLS: KSC15 N/N | 053:03:20:29Z VEL: 188 KGS 190 KEAS | WEIGHT: 201138 LBS X CG: | <u>LAT</u> : 37.192 S | | ENTRY RANGE: 4367.5 NM | | SHUTTLE ACCUMULATED WEIGHTS: | - Baselined STS-130 to FDRD - launch date of 12/10/09 on 11/17/08. - Ppd. to 02/04/10 on 03/10/09. Interim change while Cx and SSP |
| TO ISS | | P821/R303/V186/M263 MS 4 Robert L. Behnken | TAL: ZZA 30L N/N AOA: KSC 15 N/N 1ST DAY 22D N/N | HDOT: -1.9 FPS <u>TD NORM 195</u> : | 1082.8 IN LANDING: | <u>LONG</u> : 159.603 W | | | | DEPLOYED: 1641533 LBS | schedules were assessed and prioritized Ppd. to 02/07/10 on 12/17/09. Launch date change supports efficient use of KSC ground operation resources. |
| 2 Junes | | (Flt 2 - STS-123) P822/R323/V213/M279 | 22R N/N <u>TDEL</u> : 0.000 (P) 0.232 (A) | 2405 FT DRAG CHUTE | WEIGHT: 201084 LBS X CG: | | | | | NON-DEPLOYED: 1626311 LBS | <u>LAUNCH SCRUBS</u> : Sunday, 02/07/10 launch attempt was terminated about an hour before scheduled launch of 4:40 AM |
| ROBINS | | SS EVA 148 DOCKED OUEST EVA 66 | MAX Q NAV: | <u>DEPLOY</u> : 185 KEAS 053:03:20:31Z | 1084.8 IN | | | iss022e0626 | 672 | CARGO TOTAL: 4210929 LBS | EST. Launch scrub was due to a massive area of low cloud ceilings that blanked the northern half of Florida launch was reset for 02/08/10. WEATHER SCRUB. |
| | Parties - | DOCKED QUEST EVA 66 EMU/TETHERED EVA 141 SCHEDULED EVA 139 DURATION 6:32 | 757.6 (P) 756.6 (A) <u>SRB STG</u> : 2:05.9 (P) 2:07.2 (A) | NLGTD: 5219 FT 53:03:20:36Z VEL: 157 KGS 158 KEAS | | | ı | | | PERFORMANCE MARGINS (LBS): FPR: 2908 FUEL BIAS: 1059 | LAUNCH WINDOW: Total launch window was 11M 57S with window open at 39:09:09:42Z and close at 39:09:21:39Z. Preferred Launch Time was 39:09:14:07Z (In-Plane Time) for a launch window of 7M32S. |
| NODE 3 | TRANQUILITY | SS EVA 149 DOCKED QUEST EVA 67 EMU/TETHERED EVA 142 | PERF: NOMINAL | HDOT: -6.2 FPS BRK INIT: 113 KGS | | | | | | FINAL TDDP: 1188 RECON: 2828 | LAUNCH DELAYS: None. Launch occurred on time at |
| 37S-130 | ISS 20A | SCHEDULED EVA 140 DURATION 5:53 | 2 ENG TAL (ZZA): 2:42 (P) 2:43 (A) | DRAG CHUTE JETTISON: | Shuttle appro | aches ISS | S with | Node 3/Cupo | la. | PAYLOADS: PLB: ISS-20A (NODE 3 | 39:09:14:07Z on Monday 02/08/10. TAL WEATHER: Spaceflight Meteorology Group (SMG) reported |
| | CUPOLA | SS EVA 150 DOCKED QUEST EVA 68 EMU/TETHERED EVA 143 | NEG ZZA (2@ 104): 3:52 (P) 3:54(A) | 54 KGS 255:00:54:06Z | 1 | | | | | W/CUPOLA) MIDDECK: | "quite challenging" weather for TAL sites: low clouds & showers at Moron & showers in 20 circle at ZZA. Recon aircraft at ZZA reported moisture (not rain droplets) so TAL "rain shower rule " |
| | | SCHEDULED EVA 141 DURATION 5:48 | | BRK DECEL FPS ² : AVE 2.7 PK 10.1 | | | | | | ISS-20A, MAUI, SEITE, SIMPLEX, | was invoked for "GO". Istres changed form "GO" to "NO GO" (Low cloud ceiling) late in launch count. PERFORMANCE ENHANCEMENTS: |
| | | Continued | <u>SE TAL (ZZA 104)</u> : 6:02(P) 6:00(A) Continued | <u>WHEELS STOP</u> : 053:03:22:00Z 12966 FT | | | | | | RAMBO-2 5 CRYO TANK | Include the standard set plus: 1) PE Operational High Q - WIN/FEB, 2) OMS Assist, 3) a 52 nautical mile MECO, and 4) Del Psi |
| | | | | Continued | ISS022E088332 | | is | ss022-e-06883 | 32 | SETS ODS, SRMS (87), OBSS, SSPTS, SPDUS | Continued |

| | | | Page 2-222 - STS-130/20A | | | | | | | | |
|----------------------|---|---|---|---|----------------------------------|-------------|--|-------|-----|--------------------------|---|
| FLT | ORBITER | CREW (6) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS-130/ | | Continued | Continued | | | | | | | | Continued |
| 20A Continued | 20A MCC WHITE FLIGHT FCR PTM (U/S 181 FPS): | | | | | | FLIGHT DURATION CHANGES: On FD6 <i>MMT agreed to add +1 day to nominal flight plan to</i> | | | | |
| CAPCOMS SHUTTLE | <u>:</u> | FLIGHT DIRECTORS: SHUTTLE: A/E- Norm knight | <u>SE PRESS 104</u> 6:57(P) 6:56 (A) | facilita well as | | | | | | | facilitate complete transfer of the regen ECLSS racks to Node 3 as well as assist with accomplishing other flight objectives. Landed on KSC Runway 15 at 053:03:20:29Z, Sunday, February 21, 2010 at 9:20:29 CST. |
| A/E - Rick S | Sturckow | LD/O1- Kwatsi Alibaruho | | 1 | | | FIRSTS/LASTS: | | | | |

O2- Gary Horlacher

Team 4- Paul Dye

O1 - Royce Renfrew

O3 - Mike Lammers Team 4 - Dana Weigel

LD/O2 - Bob Dempsey

Planning- Chris Edelen

MOD – John Mccullough

- Steve Frick (Wx)

- Rick Sturckow

(Flt Days 3 & 12)

LD/O1 - Danny Olivas

O2 - Mike Massimino Planning - Shannon

O1 - Robert Hanley

LD/O2- Hal Getzelman O3 - Kathy Bolt

Lucid

<u>ISS</u>

Team 4 - N/A

8:22.5 (P) 8:21.4 (A)

25819(P) 25817(A)

37:44 (P) 37:42(A)

143.4(P) 142.1(A)

FPS

Prelaunch in JSC MOCR. Flight Dynamics Officer (FDO) Mark McDonald works on abort landing site plannning.



Endeavour launch as seen in time lapse photo from top of the Intracoastal Waterway Bridge in Ponte Vedra, FL, 115 Miles from the launch site, Monday, February 8, 2010 @ 4:14 am EST. Photo by: James Vernacotola, copyright 2010: www.jamesvernacotola.com

FIRSTS/LASTS:

- Shuttle's last night launch.
- Cast U.S. on-orbit Segment (Node 3) installed on ISS.
 Orbiter: First flight of Main Engine Ignition Overpressure
 Acoustic Instrumentation.
- First lunar rock returned to space. The sample was collected on Apollo 11 by Neil Armstrong in 1969 and carried by Scott Parazynski (Shuttle astronaut) in 2009 on his climb of Mt. Everest. Now on ISS, it orbits Earth once again.

NIGHT LAUNCH: # 34

NIGHT LANDING KSC #17: (#23 in Shuttle history)

RENDEZVOUS: #77 Rendezvous and dock with ISS.

- FD1: OMS2 ignition at 039:09:51:49Z resulted in a 124.0 by 110.0 NM orbit.
- FD2: During RCC surveys the crew downlinked some views of pulled up portion of port wing upper surface flapper door seal area. Area was cleared.
- T1 maneuver at 041:02:28:25Z resulted in a 187.4 by180.7 NM
- FD3: R-Bar Pitch Maneuver was performed. No issues. MMT concurred no focus inspection required.
- Docking Contact occurred at 041:05:05:56Z
- Hard Dock, hooks closed, occurred at 041/05:54:12Z
- ISS Hatch opened at 1:16 AM CST Wednesday, Feb. 10, 2010, welcomed by ISS crew.
- FD4: EVA 1: Behnken & Patrick successfully completed preparations for unberthing Tranquility (Node 3). ISS arm unberthed Node 3 & installed it on Node 1 port side followed by crew activation. EVA1 duration 6:32.
- FD7: EVA2: Behnken & Patrick All planned activities were completed including installation of the ammonia jumpers, integrating Node 3 to EATCS Loop A, and installing the Node 3 port center disc cover (CDC). Cupola was successfully relocated. EVA2 duration 5:53.

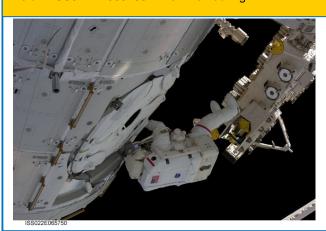
GHLIGHTS UBS/DELAYS, SCENT I-LOADS, FANOMALIES, ETC.)

SPACE SHUTTLE MISSIONS SUMMARY

| FLT | ORBITER | CREW (6) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIG (LAUNCH SCRUI |
|-----------|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|----------|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASO FIRSTS, SIGNIFICANT A |
| STS-130/ | | | | Continued | | | | | | | Continued |
| 20A | | | | ROLLOUT: 10206 FT | | | Z | | The same | | EVENTS: Continued FD8: Cupola unberthed and move |
| Continued | | | | 1·31 M·S | | | 100 | | | 1 | port of Tranquility. |



ISS construction and maintenance continue. Above: ISS022-E-062844 -- Patrick during EVA1. Below: ISS022-E-065750 -- Behnken during EVA 2



WINDS: 5H KTS 0.3R KTS OFFICIAL: 16007P10KT (X1P1 H7P10)

DENS ALT: 410 FT

FLT DURATION: 13:18:06:22

<u>S/1</u>: 1250:11:48:03

OV-105: 280:09:39:23

DISTANCE: 5,738,991 sm

TOTAL SHUTTLE DISTANCE: 513.386.662 sm



ISS022-E-067727 --- Crews for STS-130 (red) & Exp 22 (blue) in Harmony node. Front row (lt to rt): Exp 22 CDR Jeffrey Williams, Patrick/MS, CDR Zamka, & Behnken/MS. Middle row: Exp 22 Soichi Noguchi/FE (JAXA), Hire/MS, & Exp 22 T.J. Creamer/FE. Back row: Maxim Suraev & Oleg Kotov, both Exp 22/FE (RSA); along with Robinson/MS & PLT Virts.



2010-02-17-0001Hq --- U.S. President Barack Obama, with members of Congress and middle school pupils, waves goodbye to Shuttle crew from the White House.

- FD8: Cupola unberthed and moved from forward end to nadir port of Tranquility.
- FD10: EVA3: Benken & Patrick All planned and a number of get ahead tasks were completed including Loop B QD opening (integration of EATCS Loop B with Node 3 heat exchanger), PMA-3 cable installation, Cupola MLI removal, and VSC video cable routing. EVA3 duration (PET) 5:48.
- -Transfers:
- 36,130 Pounds of hardware transferred to ISS (inside & out)
- 29,788 Tranquility Node 3 weight in pounds (as installed)
- 3,594 Cupola
- 757 Integrated Stowage Platform cargo
- 24 Pounds of Oxygen transferred into ISS Airlock tanks0 Pounds of Nitrogen transferred (N2 was used to repress the stack)
- 1,991 Pounds of middeck items delivered to ISS aboard Endeavour
- 1,803 Pounds of middeck items returned <u>from</u> ISS to Endeavour
- ~1,095 Pounds of water transferred to ISS
- 799,045 Mass in space of the International Space Station (in pounds)
- FD13: Undocked at 051:00:53:52Z
- During entry a manual handover to TDRS-46 early avoided rolling on to a lower antenna and prevented a comm blackout period.

| FLT NO. | ORBITER | CREW (6) TITLE, NAMES & EVA'S | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS | SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N. | SRB RSRM AND ET | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
|------------|---------|--|--|---|---|--------------------------|-----------|----------------|-----|---|--|
| STS-130/ | | | Quoting Oscar | Wilde's "Life imi | | Zani - | Continued | | | | |

20A Continued.

Quoting Oscar Wilde's "Life imitates art far more than art imitates life", Dave Zani -CinemaBlend.com, sees the Cupola window as the inside window of a Star Wars TIE Fighter.



ISS022-E-067184 --- Behnken (left) & Patrick removing insulation blankets & launch bolts from Cupola's windows.



S130-E-010380--- Soichi Noguchi/ JAXA/FE ISS Exp 22, takes earth photo from a window in Cupola.



ISS022-E-068724 -- CDR Zamka tries out view from Cupola.

SIGNIFICANT ANOMALIES:

- Orbiter:
 During STS-130 Ascent monitoring, WLE Sensor Unit S/N 1155 experienced two (2) off-scale high data spikes.
 MUX bypass switch will not switch to Bypass front for OCA 48Mbps downlinks.
 Audio drop-out during EVA 1.
 Trajectory Control Sensor (TCS) had trouble transitioning to CW mode. CW data became ratty and unusable.
- 12 IFA's entitled "STS-130 Post Launch Debris" SRB: None.

RSRM: None.

SSME: None.

- POST-FLIGHT REV. IDENT. 2 FOAM LOSSES +Z SIDE INTERTANK NCFI 24-124 ACREAGE, 19 FOAM LOSSES ?Z SIDE OF THE INTERTANK NCFI 24-12 ACREAGE
- INCORRECT TAL RUNWAY SURFACE IN FLIGHT RULE Integration: None.



JSC2010-E- 017955 --- Flight Directors in JSC MCC: From left: Chris Edelen, Norm Knight, Kwatsi Alibaruho and Gary Horlacher.



S130-E-012188 --- ISS as seen by Endeavour postundocking and separation. Tranquility & Cupola are located just left of center.



STS130-S-128 --- Drag chute is deployed at MLGTD on KSC Runway 15 at 10:20:29 PM EST on Feb. 21, 2010. It was the 23rd night landing in Shuttle history and the 17th at KSC.

| | | CREW | | LANDING SITE/ | SSME-TL | | | | | | |
|--|--|---|---|---|--|---|--------|---|--------|--|--|
| FLT | ORBITER | (7) | LAUNCH SITE, LIFTOFF TIME, | RUNWAY, CROSSRANGE | NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | ORBITEIX | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | TOW | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS- 131/19A SEQ FLT # 131 | OV-103 (Flight 38) DISCOVERY OMS PODS LPO1 -41 | CDR: Alan G. Poindexter (Flt 2- STS-122) P823/R318/V214/M274 PLT James P. Dutton, Jr. P824/R352/M305 | | KSC33 KSC (74) 110:13:08:34Z 8:08:34 AM CDT Tuesday (18) 04/20/10 (12) | 104/104/ 109% PREDICTED: 100/104.5/104.5/ 72/104.5 | BI-142 RSRM 110 ET-135 | (33) | DIRECT INSERTION POST OMS-2 140.0x123.8 NM | (4) | CARGO: 39516 LBS PAYLOAD CHARGEABLE: 32131 LBS | Brief Mission Summary: The STS-131 (33rd mission to ISS), dubbed "Experiment Express" by PAO, main objectives were to bring some 8 tons of supplies and scientific equipment to ISS, remove & replace a depleted Ammonia tank, and return a large load of experiments and no longer useful gear back to earth. |
| KSC-131 PAD 39A (54) MLP-3 33rd SHUTTLE FLIGHT TO ISS | RPO3-39 FRC3-38 | MS 1 Rick Mastracchio (Fit 3 - STS-106, STS-118) P825/R257/V189/M224 MS 2 Dorthy Metcalf-Lindenburger P826/R353/F48 MS 3 Stephanie Wilson (Fit 3 - STS-121, STS-120) P827/R298/V190/F39 MS 4 Naoko Yamazaki (JAXA) P828/R354/F49 | LAUNCH WINDOW: Dual pane day with window open at 95:10:18:40Z and close at 95:10:27:17Z 5M 52S (Preferred) EOM PLS: KSC TAL: ZZA TAL WX: MRN FMI (NO GO) SELECTED: RTLS: KSC33 N/N TAL: MRN20 N/N | AIM PT: NOMINAL MLGTD: 3559 FT 110:13:08:34Z VEL: 198 KGS 198 KEAS HDOT: -1.6 FPS TD NORM 195: | ACTUAL: 100/104.5/100/ 72/104.5 1 = 2045 (11) 2 = 2060 (2) 3 = 2054 10) M 3 EOM: WEIGHT: 224257 LBS X CG: 1089.0 IN LANDING: WEIGHT: | ET IMPACT 1:13:55 MET LAT: 37.233 S LONG: 159.667 W | | DEORBIT HA 190.6 NM HP 14.2 NM ENTRY VELOCITY: 25862 FPS ENTRY RANGE: 4480 NM | | DEPLOYED: 30512 LBS NON-DEPLOYED: 1388 LBS MIDDECK: 231 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 1672045 LBS | KSC W/D OPF: 142 days + 11 holidays VAB: 9 days + 0 contingency days PAD A: 32 days + 2 contingency days Total Work Days = 183 (OPF processing occurred over a total time period of 153 days POSTPONEMENTS: - Baselined STS-131 to FDRD - launch date of 03/18/10 on 02/05/09 Ppd. to 04/05/10 on 03/09/10. Due to cold weather conditions, Orbiter rollover from the OPF to VAB was delayed such that the March 18, 2010 launch date could not be met. LAUNCH SCRUBS: None |
| - | | MS5 Clayton Anderson (Fit 2-UP ON STS-117STAY ISS, DN ON STS-120) P829/R310/V215/ M268 SS EVA 151 DOCKED QUEST EVA 69 EMU/TETHERED EVA 144 SCHEDULED EVA 142 | AOA: KSC33 N/N 1ST DAY PLS KSC15 N/N TDEL: 0.000 (P) 0.142 (A MAX Q NAV: | 2955 FT DRAG CHUTE DEPLOY: 191 KEAS 110:13:08:36Z NLGTD: 6398 FT 110:13:08:43Z VEL: 157 KGS | 224206 LBS X CG: 1090.7 IN | | g! | | | NON-DEPLOYED: 1627930 LBS CARGO TOTAL: 4250445 LBS PERFORMANCE MARGINS (LBS): FPR: 2908 | LAUNCH WINDOW: Dual pane day with window open at 95:10:18:40Z and close at 95:10:27:17Z. Preferred Launch Time was 95:10:21:25Z (In-Plane Time) for a launch window of 5M52S. LAUNCH DELAYS: None. Launch occurred on time at 95:10:21:25Z on Monday 04/05/10. |
| | | DURATION 6:27 SS EVA 152 DOCKED QUEST EVA 70 EMU/TETHERED EVA 145 SCHEDULED EVA 143 DURATION 7:26 SS EVA 153 DOCKED QUEST EVA 71 | 708.0 (P) 700.5 (A) <u>SRB STG:</u> 2:04.8 (P) 2:05.8 (A) <u>PERF:</u> NOMINAL <u>2 ENG TAL (MRN):</u> 2:36 (P) 2:41 (A) | 160 KEAS HDOT: -4.4 FPS BRK INIT: 107 KGS DRAG CHUTE JETTISON: 58 KGS 110:13:09:31Z | | | | | | FUEL BIAS: 1059 FINAL TDDP: 1133 RECON: 1491 PAYLOADS: PLB: ISS-19A (MPLM,LMC), TRIDAR AR&D SENSOR DTO- 701A | TAL WEATHER: Spaceflight Meteorology Group (SMG) reported a pressure gradient between a high & a departing low contributed to winds at Istres above headwind limits. Only high cirrus clouds prevailed at both Zaragoza & Moron with winds well within flight rule limits. Weather was "GO". PERFORMANCE ENHANCEMENTS: Include the standard set plus: 1) PE Operational High Q - TRN/APR, 2) OMS Assist, 3) a 52 nautical mile MECO, and 4) Del Psi |
| SABATIEN CO | INAMES ER | EMU/TETHERED EVA 146 SCHEDULED EVA 144 DURATION 6:24 Continued | PTA (U/S 157 FPS): 5:17(P) 5:206(A) | AVE 5.2 PK 7.0 WHEELS STOP: | ISS023-E-0 Canadarm2 from Discor Harmony n | 2 relocate very's PL | es Lec | robotic onardo (MPI | VANT : | MIDDECK: ISS-19A, MAUI, SEITE, SIMPLEX, RAMBO-2 5 CRYO TANK SETS ODS, SRMS (88), OBSS, SSPTS, | FLIGHT DURATION CHANGES: - FD 4: MMT approved plan for conducting a docked late inspection using +1 day - extended mission from 12 to 13 days Landing postponed 1 day due to unstable weather. Weather was still unsatisfactory next day with fog and area showers for first opportunity. Weather cleared for "Go" on 2nd opportunity at KSC. Landing occurred at 110:13:08:34Z, Tuesday, April 20, 2010, at 8:08:34 AM CDT |

| | | | SP | ACE SHU | JTTLE | MISS | | NS SU | MM | IARY | Page 2-226 - STS-131/1 |
|--|-----------------------|--|---|--|----------------------------------|-------------|--------|----------------------------|---------|--------------------------|--|
| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS- 131/19A Continued | | Continued MCC WHITE FLIGHT FCR (61) | Continued PTM (U/S 180 FPS): 6:20(P) 6:29(A) SE PRESS 104 | Continued WINDS: 2.1H KTS 2.2R KTS OFFICIAL: 02003P05KT (X0P0 | | | | | | | Continued FIRSTS/LASTS: - Last return trip for MPLM Leonardo. After STS-133 it will on ISS as a permanent fixture First time for four women living in space. |
| | turckow e Zamka/Wx | FLIGHT DIRECTORS: SHUTTLE: A/E- Bryan lunney LD/O1- Richard Jones O2- Mike Sarafin | 6:58(P) 7:01 (A) <u>MECO CMD</u> : 8:22.5 (P) 8:23.5 (A) VI: | DENS ALT: 908 FT FLT DURATION: | | | | | | | First time for two Japanese astronauts in space together. First special cookies from the Italian Café in Seabrook, Tirequested originally by Col. Timothy Creamer after a 6-mo tour, were delivered to ISS. The sand tarts passed NASA twith the request to go light on the powdered sugar. |
| LD/O1 - Rick O2 - Aki Hos Planning - Megan M | shide //cArthur | Planning- Ginger Kerrick MOD – John Mccullough Team 4- Gary Horlacher | 25819(P) 25816(A) OMS-2: 37:16 (P) 37:14(A) | 15:02:47:09 <u>S/T</u> : 1265:14:35:12 | STOAM S | 050 N | | Communitation | n Miles | Curio and | NIGHT LAUNCH: N/A RENDEZVOUS: #78 Rendezvous and dock with ISS. |
| - Chris Car Team 4 - N/A | | ISS O1 - Courtenay McMillan LD/O2 - Roy Spencer O3 - Ed Van Cise | 197.2(P) 196.5(A) FPS | OV-103: 347:03:20:09 | | athryn (k | (ay) H | Commentato lire discuss | | | EVENTS: - FD1: OMS2 ignition at 095:10:58:39Z resulted in a 140.0 123.8 NM orbit. |
| O1 - Mike Je LD/O2 - Star O3 – Marcus Team 4 – N/ | n Love s Reagant | Team 4 - Brian Smith | | DISTANCE: 6,232,235 sm TOTAL SHUTTLE | | E II | | | | | FD2: During RCC surveys showed no areas of concern. T1 maneuver at 097:05:06:44Z resulted in a 189.3 by18 orbit Ku Band failed. |

DISTANCE:

519,613,765 sm



In JSC MCC, Carson Sparks/FDO (Flight Dynamics Officer) in foreground & Tom Schmidt/GPO (Guidance & Procedures Officer), in rear, working launch data updates one hour prior to launch.



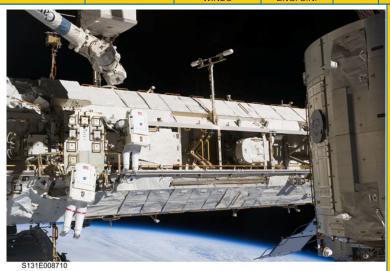
S131-E-010002 --- STS-131 & EXP 23 crews gather in ISS Kibo Lab STS-131 crew members pictured (light blue shirts) are CDR Poindexter, PLT Dutton; Anderson/MS, Mastracchio/MS, Metcalf-Lindenburger/MS, Wilson/MS, & Yamazaki/MS (JAXA). EXP 23 crew members are CDR Oleg Kotov (RSA), Mikhail Kornienko/FE (RSA), Alexander Skyortsoy/FE (RSA); Soichi Noguchi/FE (JAXA), T.J. Creamer/FE (USA), & Tracy Caldwell Dyson/FE (USA).

- eonardo. After STS-133 it will remain
- living in space.
- astronauts in space together.
- the Italian Café in Seabrook, TX. Timothy Creamer after a 6-month ISS The sand tarts passed NASA tests on the powdered sugar.

- :10:58:39Z resulted in a 140.0 by
- showed no areas of concern.
- :44Z resulted in a 189.3 by181.7 NM
- FD3: R-Bar Pitch Maneuver was performed. Four areas of interest were identified: 1) RSB Trailing Edge Tile, 2) FWD Gap Filler, 3) Port ET Door Tile Chip, 4) three closely grouped OMS POD tile damage sites. The Damage Assessment Team later cleared these areas for entry and MMT concurred no focus inspection required.
- Crew executed the radar fail procedures for rendezvous after the system failed to respond to a last attempt early in the rendezvous.
- Docking Contact occurred at 097:07:44:09Z
- Hard Dock, hooks closed, occurred at 097:07:58:52Z
- ISS Hatch opened at 4:11 AM CDT April 7, 2010, welcomed by ISS crew.
- FD4: MPLM was grappled, unberthed, and installed on the Node 2 Nadir without issue.
- FD5: EVA 1:Mastracchio & Anderson remove old ATA and handover new ATA to SSRMS, retrieve JEM SEED, & R&R RGA. EVA1 duration 6:27.

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE FNG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |

STS-131/19A Continued



AT LEFT: S131-E-008710 --Mastracchio (left) & Anderson conduct 2nd EVA during which they unhooked and removed depleted ammonia tank and installed a 1,700pound ammonia tank on ISS Starboard 1 truss. Crew had problems with bolting down the new ATA tank on S1. They eventually got all 4 bolts secured, however, the time required to do this resulted in several tasks dropping off this EVA.

S131-E-009456 --- Mastracchio (right) & Anderson conduct 3rd & final session of EVA. Activities included fluid lines hookup of new 1,700-pound ammonia tank and prepared cables on the Zenith 1 truss for a spare Space to Ground Ku-Band antenna.



S131-E-007954 --- First time four women in space shown in the Zvezda Service Module: clockwise from lower left: are Tracy Caldwell Dyson/FE EXP 23, Metcalf-Lindenburger/MS, Yamazaki/MS(JAXA), & Wilson/MS.

Continued...

EVENTS: Continued

- FD6&7: EVA2: Mastracchio & Anderson had difficulty installing new ATA onto S1 truss due to sticky plungers on bolt 4. Numerous workarounds were employed and eventually the bolt did cooperate. Alignment of the bolts and soft dock mechanisms are orientation sensitive and the task took much more time than booked. Several tasks were not completed & were rescheduled to EVA 3. EVA2 duration 7:26.
- FD9: EVA3: Mastracchio & Anderson completed: S1 ATA Fluid connectors (from EVA 2), Retrieve A/L MMOD shields (from EVA 2), Old ATA transfer to the LMC in Shuttle payload bay (all 4 bolts were engaged, though the last bolt required extra time due to some alignment challenges), & S1 ATA FGB install. EVA3 duration (PET) 6:24.
- FD9; Monday, April 12th celebrated the 49th Anniversary of the Soviet cosmonaut, Yuri Gagarin, first human to orbit the earth in 1961 and the 29th Anniversary of the first U.S. Space Shuttle launch in 1981.
- Transfers:
- -15,222 Lbs of hardware transferred to ISS (inside & out)
- -12.060 Lbs of MPLM supplies & logistics transferred to ISS
- 4,109 Lbs of MPLM supplies & logistics returned from ISS
- 1,702 Lb Ammonia Tank Assembly (ATA) delivered to ISS
- 1,295 Lb ATA (old) returned from ISS
- 94.5 Lbs of O₂ used to repress the stack
- 1,460 Lbs middeck items delivered to ISS
- 1,235 Lbs of middeck items returned from ISS to Discovery
- 6,639 Lbs of total hardware returned aboard Discovery
- 975 Lbs of water transferred to ISS
- 806,282 Mass (Lbs) of ISS now in space
- 98 Percentage complete of ISS assembly (pressurized volume)
- FD13: Undocked at 107:12:52:10Z

 - During entry comm blackout times were approx 110/12:49:15 to 12:54:34 (~ 5.5 min). Early H/O to TDRS 46 was not an option as TDRS 46 stayed on a lower antenna. INCO prediction of LOS was in error due to DOL PAD error, noted in Significant Anomalies below. Also, see Ascent/Entry Flight Techniques Panel #255 of April 30, 2010.

| , | FLT NO. | ORBITER | CREW (7) TITLE, NAMES & EVA'S | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS | SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N. | SRB RSRM AND ET | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
|---|-----------------|---------|--|--|---|---|--------------------------|-----|----------------|-----|---|--|
| | STS- 131/19A | | | | | | 550 | XX | | 1 | | Continued |



Continued.

ABOVE: JSC2010-E-045167 --- Flight Directors for the STS-131/19A: From the left are Tony Ceccacci, Bryan Lunney, Paul Dye, Richard Jones, Ginger Kerrick and Mike Sarafin.

BELOW: JSC2010-E-051978 -- STS-131 Orbit 2 Flight Control Team pose in JSC MCC. FD Mike Sarafin holds mission logo.





Discovery's planned approach and landing track across the continental U.S. Photo courtesy JSC/PAO.



SHUTTLE051109 049(KSC)--- Discovery on approach to KSC Runway 33 on April 20, 2010, after weather waveoffs on April 19th and again on first opportunity of April 20th.

SIGNIFICANT ANOMALIES:

- Otolies:

 CCTV Camera C zoom not functioning

 DURING STS-131, KU-BAND FAILED FROM POWER UP FOR BOTH COMM AND RADAR OPERATIONS.

 NIRD 131-005, D-131-RPM-410-001: DEBRIS EVENT DURING ACCENT AT 42SEC MET FROM PORT UPPER RSB

 TRAILING EDGE. TILE HAS BROKEN AWAY, APPEARS TO BE PARTIAL LIBERATION. VISIBLE CHARRING ALONG THE
- LRCS fuel helium ISO B valve slow to close during post wave off system reconfigure.
 - FRCS fuel helium ISO A valve slow to close during post entry
- valve test.

- STS-131 Post Launch Debris

SRB:

- UPLOADED ACCELEROMETER DATA FROM THE S/N 2000003 DAS SHOWED 446 SECONDS OF PREFLIGHT TESTING FOLLOWED BY THE FIRST 94 SECONDS OF FLIGHT DATA

RSRM: None.

SSME:

- ME-2 HPFTP 21 DEGREE ACCEL DISQUALIFIED @ T+7:19

MOD:

- INCORRECT COMM PREDICTS DUE TO PADS ERROR
- Base Heat Shield TPS Liberation
 Windows 5, 6 Missing/Protruding Ceramic Plugs
 Rudder Speedbrake TPS Liberation

| FLT NO. | ORBITER | CREW (6) TITLE, NAMES | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, | SSME-TL NOM-ABORT EMERG THROTTLE PROFILE | SRB RSRM AND ET | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
|---|--|--|--|--|--|--|---------------|--|--------------|--|---|
| 132/ULF4 SEQ FLT # 132 KSC-132 PAD 39A | OV-104 (Flight 32) ATLANTIS' LAST SCHEDULED FLIGHT OMS PODS LPO4-31 RPO1-39 FRC4-31 | & EVA'S CDR: Kenneth T. Ham (Flt 2- STS-124) P830/R326/V216 /M282 PLT Dominic A. Antonelli (Flt 2 - STS-119) P831/R334/V217M289 MS 1 Garrett Reisman (Flt 2 - Up on STS-123, stay ISS, DN STS-124) P832/R325/V 218/M281 | KSC 39A 134:18:20:09Z 2:20:09 PM EDT (P) 2:20:09 PM EDT (A) Friday (28) 05/14/10 (9) LAUNCH WINDOW: 10M 01S (Total) 5M 01S (Preferred) EOM PLS: KSC TAL: ZZA | WINDS KSC33 KSC (75) 146:12:48:08Z 7:48:08 AM CDT Saturday (25) 05/26/10 (12) DEORBIT BURN: 146:11:41:59Z XRANGE: 611.3 NM ORBIT DIR: A/L (45) | ENG. S.N. 104/104/ 109% PREDICTED: 100/104.5/104.5/ 72/104.5 ACTUAL: 100/104.5/72/ 104.5 1 = 2052 (9) 2 = 2051 (8) | BI-143 RSRM 111 ET-136 SLWT 40 ET IMPACT | (34) | DIRECT INSERTION POST OMS-2 125.1x85.2 NM DEORBIT HA 195.4 NM HP 23.6 NM ENTRY VELOCITY: 25877 FPS | OI-34 (5) | CARGO: 35963 LBS PAYLOAD CHARGEABLE: 26740 LBS DEPLOYED: 26619 LBS NON-DEPLOYED: 0 LBS | Brief Mission Summary: The STS-132 (34th mission to ISS), dubbed "Finishing Touches" by PAO, main objectives were to conduct three Eva's, deliver & install the 2nd Russian Mini-Research Module, a complement of batteries, a backup Kuband antenna, and other ISS supplies. This was the last scheduled flight of Atlantis; however, Congress later approved one more flight, see STS-135. KSC WID OPF: 127 days + 9 holidays VAB: 7 days + 2 Wx days PAD A: 22 days + 1 contingency day Total Work Days = 156 (OPF processing occurred |
| MLP-2 34th SHUTTLE FLIGHT TO ISS | | MS 2 Michael Good (Flt 2 STS-125) P833/R338/V219/M293 MS 3 Steve Bowen (Flt 2 - STS-126) P834/R332/V220M287 MS 4 Piers Sellers (Flt 3 (STS-112, STS-121)) P835/R285/V182/M249 | TAL WX: MRN FMI (NO GO) SELECTED: RTLS: KSC33 N/N TAL:ZZA30 CI/N AOA: KSC33 N/N 1ST DAY PLS EDW22 N/N TDEL: 0.000 (P) 0.162 (A) MAX Q NAV: | AIM PT: Close-In MLGTD: 2919 FT | 3 = 2047 (14) M 3 EOM: WEIGHT: 210434 LBS X CG: 1081.0 IN LANDING: WEIGHT: 210370 LBS X CG: 1082.9 IN | 1:14:24 MET LAT: 35.906S LONG: 157.809W | | ENTRY RANGE: 4334 NM | anh | MIDDECK: 121 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 1698664 LBS NON-DEPLOYED: 1628051 LBS CARGO TOTAL: 4286408 LBS | over a total time period of 136 days. POSTPONEMENTS: - Baselined STS-132 to FDRD - launch date of 05/13/10 on 04/02/09 Ppd. to 05/14/10 on 05/04/09. ISS request to de-conflict dynamic vehicle events of a Soyuz undocking and Orbiter docking on the same day. LAUNCH SCRUBS: None LAUNCH WINDOW: Window open at 134:18:15:09Z and close at 134:18:25:10Z. Preferred Launch Time was 134:18:20:09Z |
| | | SS EVA 154 DOCKED QUEST EVA 72 EMU/TETHERED EVA 147 SCHEDULED EVA 145 DURATION 7:25 SS EVA 155 DOCKED QUEST EVA 73 EMU/TETHERED EVA 148 SCHEDULED EVA 146 DURATION 7:09 SS EVA 156 | 722.4 (P) 708.3 (A) SRB STG: 2:02.7 (P) 2:05.0 (A) PERF: NOMINAL 2 ENG TAL (MRN): 2:42 (P) 2:36 (A) NEG MRN (2@ 104): 3:56(P) 3:58(A | | | | Delta- | London Telegra | арп | PERFORMANCE MARGINS (LBS): FPR: 2908 FUEL BIAS: 1059 FINAL TDDP: 5074 RECON:4326 PAYLOADS: PLB: ISS-ULF4 (MRM1,ICC-VLD, ICAPC/PDGF0 | (In-Plane Time) for a launch window of 5M01S. LAUNCH DELAYS: None. "It's a beautiful day in Florida to bid "Bon Voyage" to the good ship Atlantis on its sunset cruise. "-KjH (Space Shuttle Program Public Affairs). Launch occurred on time at 134:18:20:09Z on Friday 05/14/10. TAL WEATHER: Spaceflight Meteorology Group (SMG) reported a high pressure ridge provided benign weather at KSC for launch and RTLS. Things were trickier for TAL Sites with low pressure system resulting in breezy conditions at ZZA & MRN. By launch winds decreased below Flight Rule limits. At Istres rains remained outside of 20 NM watch area. Weather was "GO". |
| | | DOCKED QUEST EVA 74 EMU/TETHERED EVA 149 SCHEDULED EVA 147 DURATION 6:46 Continued | PTA (U/S 157 FPS): 4:45(P) 4:56(A) Continued | It's a beautiful da Atlantis on its sui | | PAO). | <i>ge"</i> to | the good ship | | MIDDECK: ISS-ULF4, MAUI, SEITE, SIMPLEX, RAMBO-2 5 CRYO TANK SETS, ODS, SRMS (89), OBSS, SSPTS | PERFORMANCE ENHANCEMENTS: Include the standard set plus: 1) PE Operational High Q - TRN/MAY, 2) OMS Assist, 3) a 52 nautical mile MECO, and 4) Del Psi FLIGHT DURATION CHANGES: None. Continued |

| | SPACE SHUTTLE MISSIONS SUMMARY Page 2-230 - STS-132 | | | | | | | | | | | | | |
|---|---|---|--|--|---|---|---|---|--|--|---|--|--|--|
| FLT NO. | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, LANDING SITES. | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG THROTTLE | SRB RSRM | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, | | | |
| | | TITLE, NAMES & EVA'S | ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | PROFILE ENG. S.N. | AND ET | IINC | HA/HP | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) | | | |
| STS- 132/ULF4 Continued | OV-104 | Continued MCC WHITE FLIGHT FCR (62) | SE TAL (ZZA 104): 6:02(P) 6:02(A) PTM (U/S 181 FPS): | Continued DRAG CHUTE DEPLOY: 190 KEAS 146:12:48:10Z | | | | | | | Continued FIRSTS/LASTS: - Last scheduled flight of Atlantis The Mini Research Module 1 (MRM1), aka Rassvet, is first & only major piece of Russian H/W that U.S. hauled to ISS. | | | |
| CAPCOMS: SHUTTLE A/E - Charli - Steve LD/O1 - Chr | Frick (Wx) | FLIGHT DIRECTORS: SHUTTLE: Ascent- Richard Jones LD/O1- Mike Sarafin O2- Chris Edelen | 5:48(P) 5:59(A) <u>SE PRESS 104</u> 6:51(P) 6:53 (A) | NLGTD: 6227 FT 146:12:48:19Z VEL: 135 KGS 141 KEAS | | | | | | | - First evaluation of Commercial Compression Garments to prevent post-spaceflight Orthostatic Intolerance First RSRM incorporation of V1288 fluorocarbon O-rings in nozzle joints 4 and 5. TENTH SHUTTLE CREWMEMBER REPLACEMENT | | | |
| O2 - Stan Lo Planning - S Lucid Team 4 - N/ | hannon | Planning- Ginger Kerrick Entry - Tony Ceccacci MOD – John Mccullough Team 4 - Paul Dye | MECO CMD: 8:24.1 (P) 8:25.6 (A) VI: 25819(P) 25819(A) | HDOT: -5.0 FPS BRK INIT: 59 KGS DRAG CHUTE JETTISON: | | | | | | | Karen Nyberg (medical condition) was replaced by Michael Good in August 2009. (9th Shuttle crewmember replacement occurred on STS-118.) NIGHT LAUNCH: N/A NIGHT LAUNCH: N/A | | | |
| O1 - Zach J LD/O2 - Ste O3 - Rob H Team 4 - N | ve Swanson ayhurst | O1 - Holly Ridings LD/O2 - Emily Nelson O3 - Dina Contella Team 4 - Royce Renfrew | OMS-2: 37:47 (P) 38:15(A) 98.8(P) 97.4(A) FPS | 57 KGS 146:12:48:47Z BRK DECEL FPS ² : AVE 2.7 PK 4.1 | (ctr lt), CDR Good/MS, Al Reisman/MS | d shirts) o Ham (ctr i exander S s. Back (fi | n ISS. rt), with Skvorts rom It): | Front: Exp ((from It) T.J. sov (RSA)/FE Bowen/MS, | DDR Ole Cream Exp 23 Tracy O | eg Kotov/RSA ner/FE Exp 23, 3, & Caldwell | RENDEZVOUS: #79 Rendezvous and dock with ISS. EVENTS: Gerst: The entire team gave us a great launchnice ET [only] one small piece of foam late in ascent." | | | |
| ISS023E044569 | É | | | WHEELS STOP: 146:12:49:27Z 12019 FT ROLLOUT: 9100 FT 1:19 M:S WINDS: | Dyson/FE Ex (RSA)/FE, Pl BELOW: \ Atlantis' TPS preventing th properly. Du tied off cable | While preponents on FD2, he sensor tring EVA | elli, & S paring f crew di packag 2 the c | for the routing iscovered a page pan and tile crew success | ni (JAX/ e inspe pinched It unit fr fully un | A)/FE Exp 23. ction of cable om moving | FD1: OMS2 ignition at 134:18:58:24Z resulted in a 125.1 by 85.2 NM orbit. FD2: During RCC surveys a camera cable was wedged between camera & OBSS structure limiting tilt capability. This left gaps in RCC survey. Ops team developed plan to get docked imagery and cable assess during EVA.[Post mission: It was determined that the snag was attributed to cable S/N unique memory characteristics. Cable was replaced with a different S/N cable.] | | | |



Iss023e044569 -- Atlantis on 'Final Approach' to ISS with Russian MRM1. 8 H KTS 2 L KTS OFFICIAL: 31508P11 (X 3p4 HD 8p10)

DENS ALT: 1652 FT

FLT DURATION: 11:18:27:59

<u>S/T</u>: 1277:09:03:11

<u>OV-104:</u> 294:18:27:11

Continued...



- T1 maneuver at 136:11:40:09Z resulted in a 189.7 by184.8 NM
- FD3: R-Bar Pitch Maneuver was performed. Docking Contact occurred at 136:14:28:25Z.
- Hard Dock, hooks closed, occurred at 136:14:40:49Z.
- ISS Hatch opened at 11:18 AM CDT May 16, 2010, welcomed by ISS crew.
- FD4: EVA 1: Reisman & Bowen installed SGANT & EOPT EVA1 duration 7:25.
- FD5 Russian MRM1 successfully unberthed and docked to ISS. FD6: EVA2: Bowen & Good successfully completed all tasks:
- cleared cable from the Orbiter LDRI tilt axis, installed 4 new batteries in truss 3 old batteries into pallet, & stowed a temp. EVA2 duration 7:09.
- FD8: EVA 3: Good & Garrett activities included: completion of batteries R&R's, P6 cleanup, & PDGF trial. EVA3 duration (PET) 6:46.

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| CTC | | | | | | | | | | | Continued |

SIS-132/ULF4 Continued.

ISS023-E-047488 --- In the grasp of ISS Canadarm2. Russian-built Mini-Research Module 1 (MRM-1) is moved for permanent attachment to ISS FGB. Named Rassvet, Russian for "dawn," the module is the second in a series of new pressurized cargo storage components for Russia, Rassyet also gives ISS an additional docking port.

Continued...

DISTANCE: 4,879.978 sm

TOTAL SHUTTLE DISTANCE: 524,493,743 sm



William "Bill" Miller/DX/USA honored "In the [MOD] Spotlight" for significant contributions to Shuttle Ops. On STS-132 he provided great effort in development of alternate survey procedures when the laser sensor package camera was snagged prohibiting it from tilting correctly, see previous page.

EVENTS: Continued...

- Transfers:
- 28,792 Lbs H/W transferred to ISS (inside & out) includes
- MRM1 "Rassvet" loaded (17,670 Lbs)
- 7,573 Lbs ICC with supplies to ISS
- 6,466 LbsICC with supplies from ISS
- 42 Lbs Oxygen to ISS
- 30 Lbs Oxygen to ISS (stack repress)
- 10.5 Lbs Nitrogen to ISS
- 1.325 Lbs water to ISS
- 2,192 Lbs middeck items to ISS aboard Atlantis
- 1,763 Lbs middeck items returned from ISS aboard Atlantis
- 8,229 Lbs total H/W returned aboard Atlantis includes ICC
- 816,349 Mass (Lbs) of ISS now in space
- Undocked at 143:15:22:04Z
- During entry comm outage time due to blackout was

146/12:32:00Z - 12:34:30Z (~ MET 011/18:12 - 18:14:30). S/W handover to TS 46 was not available as TS 46 was on a Lower Antenna resulting in plasma blackout. This was well advertised. At 12:34:30Z due to Roll Reversal, TS 46 satellite works over to upper antenna and regains comm. Comm through Mila was available at 12:36:00Z with hand down to Mila at 12:37:00Z.



LEFT: ISS023-E-032398 --- Soichi Noquchi (JAXA) ISS EXP 23 FE, photographed the Mississippi Delta showing the BP oil slick in the Gulf of Mexico on May 4, 2010. Part of the river delta and nearby Louisiana coast appear dark in the sunglint. Location of oil rig is out of frame to the left. USGS Comment: "Worst oil spill in U.S. history."



S132-E-008106 -- Bowen during first EVA with Reisman (out of frame), continues construction and maintenance on the ISS, with battery replacements & installation of a 2nd Ku-band antenna.



S132-E008900 -- Good (foreground) & Reisman, are surrounded by ISS hardware during the flight's final EVA.

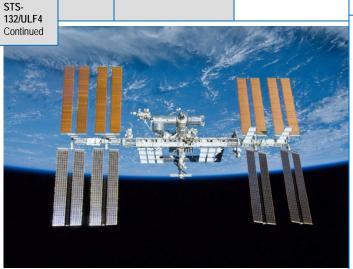
FLT ORBITER NO.

Atlantis was named after the primary research vessel for the Woods Hole Oceanographic Institute in Massachusetts from 1930 to 1966. The two-masted, 460-ton ketch was the first U.S. vessel to be used for oceanographic research. Such research was considered to be one of the last bastions of the sailing vessel as steam-and-diesel-powered vessels dominated. [From STS-132 Press Kit by PAO]

MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

Continued...

Shuttle Legacy Mural - Hanging in LCC Firing Room at KSC





S132-E-012208 -- Alantis bids final farewell to ISS!

ATLANTIS TRIBUTE: From Mike Leinbach/Launch Director/KSC

SIGNIFICANT ANOMALIES:

During Flight, a FES Shutdown Occurred While Operating on the Primary B Controller. Reference: MER-09

- STS-132 Post Launch Debris

- LEFT-HAND SRB FRUSTUM UPPER RIGHT BSM ROOM TEMPERATURE VULCANIZATION (RTV) 133 IS MISSING, MEASURING 5? LONG

RSRM: None.

SSME: None.

STS-132/ET-136 FOAM LOSS ON THE +7 SIDE OF THE NTERTANK

MOD: None.

- Unexpected Debris/Expected Debris Exceeding Mass Allowable
- Prior to Pad Clearance (Liftoff Debris)
- Ice Observed on the T-0 Umbilical at Retraction

ABOVE RIGHT: KSC-2010-4450 (http://mediaarchive.ksc.nasa.gov/index.cfm). This Tribute Display features Atlantis soaring above the earth. Atlantis flew seven missions to space station Mir. In addition to its many assembly, construction, and resupply missions to the International Space Station, Atlantis also flew the last Hubble Space Telescope servicing mission on STS-125. The planet Venus represents the Magellan probe deployed during STS-30, and the planet Jupiter represents the Galileo probe deployed during STS-34. Threaded through the design are the mission patches for each of Atlantis' flights. The inset photos illustrate various aspects of space shuttle processing as well as significant achievements such as the "glass cockpit" and the first shuttle docking with Mir during STS-71. The inset photo in the upper left corner shows a rainbow over Atlantis on Pad A and Endeavour was the assigned vehicle had Atlantis' STS-125 mission needed rescue, and this was the last time both launch pads were occupied simultaneously. The stars in the background represent the many people who have worked with Atlantis and their contributions to the vehicle's success.







--- ATLANTIS NOW HEADS TO STS-335 RESCUE MISSION PREP THEN TO THE BARN/MUSEUM! -------

"Space Shuttle Atlantis comes home to the Kennedy Space Center for the final time, 25 years, 32 flights, and more than 120 million miles traveled; the legacy of Atlantis, now in the history books," Commentator Josh Byerly remarked from his console in Houston. NASA Photos courtesy: Susan Phipps Multimedia Librarian/AP3 JSC

FLT ORBITER
NO.

------- SOME OF THE OPERATIONS SUPPORT TEAM ------

STS-132/ULF4 Continued...

OV-104 Atlantis



STS132-S-012 (14 May 2010) --- Secretary of Defense Dr. Robert M. Gates, right, NASA Associate Administrator for Space Operations William H. Gerstenmaier, center, and other NASA mission managers monitor the last scheduled launch of Space Shuttle Atlantis from Firing Room 4 at KSC.



JSC2010-E-086698 -- Orbit 1 FCT: Flight Director Mike Sarafin (center) on front row.



JSC2010-E-086504 -- Orbit 3 FCT: Flight Director Ginger Kerrick (right) holds mission logo.



JSC2010-E-086451-- Orbit 2 FCT: Flight Director Chris Edelen (second left) on front row.



JSC2010-E-087358 -- Entry FCT Flight Director Tony Ceccacci holds mission logo.



Lonnie Schmitt -First "Century Club" Controller

(From: collectSPACE.com - Robert Pearlman) - CDR Ken Ham joined in with past and present members of MCC Thursday morning [May 20, 2010] to recognize Lonnie Schmitt as the first Flight Controller to reach his 100th shuttle mission. "This is truly a momentous occasion," radioed Ham from onboard Atlantis. "We were just kicking this around on the flight deck here between us who have spent a lot of time in MCC as Capcom and know a lot of the flight controllers and offhand, we can't come up with any other individual that we know of that has been around as a flight controller since STS-1."



JSC2010-E-080436 ---Kyle J. Herring (left) & Joshua Byerly, both PAO commentators, on JSC MCC consoles during launch countdown.



JSC2010-E-063832-- ISS FD's: Left (front row) Emily Nelson & Scott Stover. Back row: Royce Renfrew & Holly Ridings.



JSC2010-E-045162 --- STS FD's: From left: Chris Edelen, Richard Jones, Mike Sarafin, Ginger Kerrick & Tony Ceccacci.

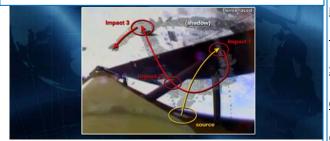


JSC2010-E-090665-- Ascent FCT: FD Richard Jones (right) & STS-132 CDR Ken Ham hold the mission logo.

| | | | | LANDING SITE/ | SSME-TL | | | | | | |
|-----------|---------------------|--|--|----------------------------------|------------------------|---------------------------|------|------------------------|--------------|-------------------------------------|---|
| | | CREW | LAUNCH SITE, | RUNWAY, | NOM-ABORT | SRB | | ORBIT | | PAYLOAD | MISSION HIGHLIGHTS |
| FLT | ORBITER | (6) | LIFTOFF TIME, | CROSSRANGE | EMERG | RSRM | | | FSW | WEIGHTS, | (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES | LANDING SITES, | LANDING TIMES | THROTTLE | AND | INC | HA/HP | | PAYLOADS/ | TAL WEATHER, ASCENT I-LOADS, |
| | | & EVA'S | ABORT TIMES | FLT DURATION, WINDS | PROFILE ENG. S.N. | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS- | OV-103 | CDR: | | | 104/104/ | | | | | CARGO: | Brief Mission Summary: The STS-133 (35th mission to ISS) |
| 133/ULF5 | (Flight 39) | Steven W. Lindsey | KSC 39A | KSC15 KSC (76) | 109% | BI-144 | 51.6 | DIRECT INSERTION | OI-34 (6) | 40108 LBS | delivered two key components to ISS – the Italian-built |
| 133/0213 | | CDR: Sieven W. Lindsey (Flt 5 - STS-87, STS-95, STS-104, STS-121) P836/R229/V131/M200 | 055:21:53:24Z 4:50:27 PM FST (P) | 068:16:57:15Z 10:57:15 AM CST | PREDICTED: | DCDM | (33) | INSERTION | (0) | | Permanent Multipurpose Module (PMM) and Express |
| SEQ | Discovery's LAST | P836/R229/V131/M200 | 4:50:27 PM EST (P) 4:53:24 PM EST (A) | Wednesday (17) | 100/104.5/104.5/ | RSRM 112 | | POST OMS-2 | | <u>PAYLOAD</u> CHARGEABLE: | Logistics Carrier 4 (ELC4) – for spare parts and storage capacity. Also delivered was Robonaut 2, the first dexterous |
| FLT # 133 | FLIGHT | PLT Eric A. Boe | Thursday (35) 02/24/11 (11) | 03/09/11 (11) | 72/104.5 | 112 | | 125.5x84.9 NM | | 31802 LBS | humanoid robot in space. <i>This was the final flight of the</i> |
| KSC-133 | | | | | | ET-137 | | DEORBIT | | 0.002 250 | most flown Orbiter, Discovery (39 flights) - The Beginning of |
| PAD 39A | OMS PODS | (Flt 2 - STS-126) P837/R331/V 221/M286 | LAUNCH WINDOW: | DEORBIT BURN: | ACTUAL: | SLWT 41 | | HA 192.9 NM | | DEPLOYED: | the END! |
| (56) | LPO1 -42 RPO3-40 | | 6M 02S (Total) | 068:15:52:04Z | 100/104.5/72/ 104.5 | w/Stringer Mod | | HP 23.2 NM | | 30576 LBS | KSC W/D |
| | FRC3-39 | MS 1 Alvin Drew | 3M02S (Preferred) | XRANGE: 24.8 NM | 104.5 | IVIOU | | ENTOV | | NON-DEPLOYED: | OPF: 138 days + 3 holidays |
| MLP-3 | 11103 37 | (Flt 2 STS-118) | EOM PLS: KSC | | 1 = 2044 (13) | ET | | ENTRY VELOCITY: | | 818 LBS | VAB HB3 (part 1):10 days + 2 contingency days |
| 35th | | P838/R314/V221/M270 | TAL: ZZA | ORBIT DIR: A/R (15) | | IMPACT | | 25868 FPS | | | PAD A (part 1): 82 days + 8 contingency days = 2 holidays (rolled back for ET repairs) |
| SHUTTLE | | MS 2 | TAL WX: MRN , | AIM PT: Close-In | 3 = 2058 (5) | 1:14:20 | | | | MIDDECK: | VAB (part 2): 35 days + 5 holidays |
| FLIGHT | | Steve Bowen (Flt 3 - STS-126, STS-131) | FMI | MLGTD: 2446 FT | M 3 EOM: | MET | | ENTRY DANGE | | 408 LBS | PAD A (part 2): 19 days + 5 contingency |
| TO ISS | | P839/R332/V220M287 | SELECTED: | 068:16:57:15Z | WEIGHT: | LAT: | | RANGE: 4387 NM | | SHUTTLE | Total Work Days = 284 (OPF processing occurred |
| MOSE | BOE | MS 3 | RTLS: KSC15 CI/N | VEL: 180 KGS | 205011 LBS X CG: | 35.535S | | 1007 11111 | | <u>ACCUMU</u> LATED | over a total time period of 141 days |
| | | Michael Barratt | TAL: ZZA30 CI/N | 197 KEAS | 1082.4 IN | | | | | WEIGHTS: | POSTPONEMENTS: |
| STS | 133 | (TMA-14 ISS EXP 19 & 20) P840/R355/M306 | AOA: KSC15 CI/N 1 ST DAY PLS | HDOT: -1.4 FPS | LANDING: | <u>LONG</u> : 158.000W | | | | DEPLOYED: 1729240 LBS | - Baselined STS-133 to FDRD - launch date of 07/29/10 on |
| | | | EDW22 CI/N (Briefed | TD NORM 195: | WEIGHT: | 158.0000 | | | | 1727240 LDS | 06/30/09. Pad to 00/14/10 on 00/20/00. Adjustments peeded for flight |
| | cori d | MS 4 Nicole Stott | to crew) | 2645 FT | 205022 LBS | | | | | NON-DEPLOYED: | - Ppd. to 09/16/10 on 09/30/09. Adjustments needed for flight product planning. |
| | | (Flt 2 - Up STS-128 stav ISS | KSC15 CI/N (Go Wx) | Continued | X CG: 1084.3 IN | | | | | 1629277 6LBS | - Ppd to 11/01/10 on 07/01/10. Slip was required to complete |
| | _ | Dn STS-129) P841/R347/V223/F47 | TDEL: | | | | | | | CARGO TOTAL: | preparations of critical spares that will be launched in the |
| | ULF-5 | F 04 1/K 34 // V Z Z 3/I 4/ | 0.000 (P) 0.092 (A) | | 40 | | | | | 4326516 LBS | Permanent Multi-Purpose Module (PMM). |
| | N. C. C. | SPECIAL PASSENGER | | | | | | | | PERFORMANCE | LAUNCH SCRUBS: - Launch scrubbed on 10/29/10 due to helium |
| | 1 | Robonaut 2 First dexterious humanoid | MAX Q NAV: | | | | | | | MARGINS (LBS): | & nitrogen leaks discovered in the right OMS pod. Launch |
| | TS-133 | robot in space - stay ISS | 714.8 (P) 710.4 (A) | | | | | | | FPR: 2821 | rescheduled for 11/02/10. On 10/30/10 launch rescheduled to |
| N | | Continued | SRB STG: | | | | | | | FUEL BIAS: 954 | 11/03/10 to allow additional time for reloading the helium tank after repair in the right OMS pod. Technical scrub. |
| | | | 2:05.9 (P) 2:06.9 (A) | | | | | | | FINAL TDDP: 1481 | - Launch scrubbed on 11/02/10 at L-1 MMT meeting due to |
| | | ROBONAUT 2 | | | | | | | | RECON: 394 | problem with center SSME controller. Launch rescheduled for |
| | | | <u>PERF</u> : NOMINAL | | | Section 2 | | | | PAYLOADS: | 11/04/10. Technical scrub. |
| | | | 2 ENG TAL (MRN): | | | Take your . | | Company of the Company | | PLB: ISS-ULF 5 | - Launch scrubbed on 11/04/10 at tanking MMT meeting due to predictions of bad weather. Launch rescheduled for 11/05/10. |
| | | Contraction of the Contraction o | 2:41 (P) 2:44 (A | | | | 9 | | 10 | (ELC 4,PMM), LWAPA | Weather scrub. |
| | | | NEG MRN (2@ 104): | | | 5 | 100 | The second second | | LWALA | - Launch scrubbed on Friday, 11/05/10 when a liquid hydrogen |
| | | | 3:54(P) 3:56(A | - | | 1/4 | | | | MIDDECK: | leak was detected about 6:30 a.m. CDT in the Ground Umbilical |
| 6 | | | | 6: | | : O | 441- | T- D- ' | | ISS-ULF 5, MAUI, SEITE, SIMPLEX, | Carrier Plate (GUCP). Mike Moses, MMT Chair stated: "This is not a stranger to us – we saw this on STS-119 and STS-127." In |
| V | II. | | PTA (U/S 160 FPS): | | rawler Carr | | | | جام میں | RAMBO-2 | addition to the leak, a crack was detected on the flange of the ET |
| | | | 5:24(P) 5:15(A) | ABOVE: STS- attempt - scrul | | | | | unch | | intertank near the oxygen tank. To allow time for engineering |
| Delivered | to ISS on S | TS-133. Flight | Continued | transporters (t | | | | | | 4 CRYO TANK | analyses of these issues, for compatibility with on orbit sun angles, |
| | | ly "awakened" | | Shuttle vehicle | | | | | | SETS, ODS, SRMS (89), | and for avoidance of other space traffic to/from ISS, the launch was reset for NET 11/30/10. |
| Robonau | it 2 on Augus | t 23, 2011. | | Launch Comp | | o. paur II | J | | | OBSS, SSPTS | Was resection IVET 11/30/10. |
| | | | | | | | | | | ., | Continued |

| | | | SP | ACE SHU | JTTLE I | MISS | IOI | NS SU | MM | ARY | Page 2-235 - STS-133 |
|--|---|---|---|--|--|--|---|---------------------------------------|------|--------------------------|--|
| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS- 133/ULF5 Continued,,, | OV-103 | Continued SS EVA 157 DOCKED QUEST EVA 75 EMU/TETHERED EVA 150 SCHEDULED EVA 148 DURATION 6:34 SS EVA 158 DOCKED QUEST EVA 76 EMU/TETHERED EVA 151 | Continued SE TAL (ZZA 104): 6:03(P) 6:01(A) PTM (U/S 180 FPS): 6:25(P) 6:28(A) SE PRESS 104 6:58(P) 7:00 (A) | Continued DRAG CHUTE DEPLOY: 191 KEAS 068:16:57:18Z NLGTD: 5439 FT 68:16:57:26Z VEL: 129 KGS 141 KEAS HDOT: -6.2 FPS | DIS | COVE | RY'S | S FINAL L | JFT- | OFF | Continued LAUNCH SCRUBS: (Continued) On 11/18/10 launch rescheduled for NET 12/03/10 due to identified analysis and ET repairs required for safe launch. On 11/24/10 launch rescheduled to NET 12/17/10 to allow analysts additional time to determine likelihood of additional ET stringer cracks during ascent. "This is turning out to be a little more complicated from an analysis standpoint," NASA's associate administrator Bill Gerstenmaier. On 12/03/10 launch rescheduled to NET 02/03/11 to validate repairs and to support engineering |
| LD/O1 - Ste O2 - Megan | e Hobaugh Wilmore (Wx) ve Robinson McArthur | SCHEDULED EVA 149 DURATION 6:14 MCC WHITE FLIGHT FCR (63) FLIGHT DIRECTORS: SHUTTLE: Ascent- Richard Jones LD/O1 - Bryan Lunney O2- Ginger Kerrick | MECO CMD: 8:22.6 (P) 8:23.8 (A) VI: 25819(P) 25818(A) OMS-2: 37:46 (P) 38:30(A) 98.8(P) 96.4(A) FPS | | | | | | | | analysis with instrumented ET Tanking Test. On 01/08/11 launch rescheduled to NET 02/24/11 to allow engineers additional time to assess new cracks resulting from tanking test. And, on 01/20/11 launch date was established as 02/24/11. This date allowed for completion of all stringer work. Technical scrub. LAUNCH WINDOW: Window open at 055:21:47:25Z and close at 055:21:53:27Z. Preferred Launch Time was 055:21:53:27Z (In-Plane Time) for a launch window of 3M02S. |
| Planning - N Massimino Ent - Charlie - Terry N Team 4 - N/ ISS O1 - Hal Ge LD/O2 - Sta O3 - Ricky A Team 4 - N/ | e Hobaugh /irts (Wx) 'A stzelman n Love Arnold | O3 - Rick LaBrode Entry - Tony Ceccacci MOD – John Mccullough Team 4 & Prelaunch: | | WHEELS STOP: 68:16:58:11Z 9641 FT ROLLOUT: 7195 FT 0:56 M:S WINDS: 18 H KTS 2 L KTS | During post drair LO ₂ -intertank Fla Dissection of 1 Sides of string at the adjacen Tobservation in Design uncha | STS-1 Inspections a conge Closeout commercealed a commercealed a commercealed according to the commerce of the | 33 / ET-1 crack was crack on bo L) and a cr -3.0°L) | 37 Intertank Stringonsoted on bth ack | | STS-133 G Wadp, LMET | LAUNCH DELAYS: 2M 57S due to Range Safety Central Command Computer anomaly. "We had about two seconds of hold time remaining, which is about one second more than Mike [Launch Director Leinbach] needed to get the job done, so we had plenty of margin," quipped Launch Integration Mgr Mike Moses. TAL WEATHER: Spaceflight Meteorology Group (SMG) reported high pressure across Spain and France for generally acceptable weather at the TAL sites. ZZA was selected as prime TAL site at crew briefing [however, earliest TAL call was based on MRN]. |

External Tank Foam Loss 3 min, 51 sec into Ascent - No Severe Damage



OFFICIAL: 15018P25KT (X2P2H18P25)

DENS ALT: 1266 FT

FLT DURATION: 12:19:03:53

1290:04:07:04

OV-103: 359: 22: 24:02

Continued...

PRCB Briefing Chart for ET-137 Intertank Stringer Crack Issue found after fourth launch scrub on 11/05/10 when a liquid hydrogen leak was detected.

weather at the TAL sites. ZZA was selected as prime TAL site at crew briefing [however, earliest TAL call was based on MRN]. Winds were gusting to 30 kts prior to crew brief, but headwinds dropped within limits at time of briefing. Isolated showers in Eastern France were never a threat and strong winds at Istres weakened enough for forecast to be amended GO.

PERFORMANCE ENHANCEMENTS: Include the standard set plus: 1) PE Operational High Q -WIN/ FEB, 2) OMS Assist, 3) a 52 nautical mile MECO, & 4) Del Psi

FLIGHT DURATION CHANGES: Plus 1 day added for PMM outfitting was approved by MMT on FD 5. The IMMT/MMT added a 2nd extra day on FD 8 to allow the six member shuttle crew to further help unload the new PMM storage unit.

Continued...

| FLT NO. | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|------------------|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| STS- 133/ULF5 | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |



ISS026-E-030282 (26 Feb. 2011) --- Backdropped by a blue and white part of Earth, Discovery approaches ISS for its last visit.



S133-E-007375 --- Bowen (top) and Drew, conduct EVA 1 as construction and maintenance continues on ISS.

Continued...

DISTANCE: 5.304.140 sm

TOTAL OV-103 **DISTANCE** 148.221.675 sm

TOTAL SHUTTLE DISTANCE: 529,797,883 sm



S133-E-007808 --- ISS's Canadarm2 grasps the Italianbuilt Permanent Multipurpose Module (PMM) for transfer from Discovery's payload bay to be permanently attached to the Unity node.



S133-E-008627 --- In U.S. Lab Destiny, crews pose for a joint STS-133/Exp 26 group portrait. The STS-133 crew in red shirts (from left) are Stott, Drew, PLT Boe, CDR Lindsey, Barratt & Bowen. In dark blue Exp 26 crew, from left, are Paolo Nespoli/ESA, Oleg Skripochka/RSA, Dmitry Kondratyev/RSA (below), Alexander Y. Kaleri/ RSA and CDR Scott Kelly and Cady Coleman (below).

Continued...

- Last flight of Discovery 1st vehicle to be retired.
- Robonaut 2 is first dexterous humanoid robot in space
- First flight of SRB Thrust Vector Control (TVC) Auxiliary Power
- Unit (APU) Phase II fuel pump

 All six existing major spacecraft from Japan, Europe, Russia and the US that service ISS were simultaneously docked for first and last time. (Proposed Soyuz fly around of ISS for historic photo of the 6 vehicles - ruled out by Russia's FSA as safety risk.)
- Last NASA module (Italian-built), the Permanent Multipurpose Module (PMM), a storage room, was attached to ISS.
- Steve Bowen is first NASA astronaut to fly on back-to-back Shuttle missions (see below).
- FD13: First "Live" Wakeup Call! Performed by Big Head Todd & the Monsters playing "Blue Sky" from MCC, Tuesday, March 8, at 3:23 a.m. CST.

11th SHUTTLE CREWMEMBER REPLACEMENT

- Tim Kopra (injury) was replaced by Bowen in Jan. 2011. (10th Shuttle crewmember replacement occurred on STS-132..)

NIGHT LAUNCH: N/A

RENDEZVOUS: #80 Rendezvous and dock with ISS.

FVF NTS:

Continued

- FD1: OMS2 ignition at 55:22:31:54Z resulted in a 125.5 by
- FD2: No Focus Inspection required for TPS/RCC
- T1 maneuver at 57:16:33:24Z resulted in a 192.4 by184.9 NM
- FD3: Performed R-Bar Pitch Maneuver.
- Docking Contact occurred at 057:19:14:18Z
- Hard Dock, hooks closed, occurred at 057:20:04:09Z
- ISS Hatch opened at 3:16 PM CST Feb. 26, 2011.
- Reboost (26 mins) at 62:14:29:36Z resulted in a 194.6 by 184.8
- FD5: EVA 1: Bowen & Drew completed all planned tasks: J612 extension cable install, Pump module retrieval from POA, Pump module install on ESP-2, CP3 camera wedge install, and Message in a Bottle Experiment. During pump installation task the cupola robotic workstation had a "loss of comm." resulting in Bowen holding the 800 lb (but now weightless) pump for 25 min. He reported "I'm fine as long as it's not too much longer." Then added 'How much longer?" Operations were transferred to the Lab robotics and task completed. EVA1 duration 6:34

| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|-----|---------|-------------------------|-------------------------------|---|--------------------------------|-------------|-----|-------|-----|--------------------------|--|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE FNG S N | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |

STS-133/ULF5



S133-E-007866 --- CDRs Scott Kelly (left) Exp 26 & Steve Lindsey STS-133 are shown in the hatch leading to the newly-installed PMM.



Discovery's planned final approach and landing track to KSC. Chart courtesy Kyle Herring/JSC-PAO.



Discovery departs ISS for last time!



DISCOVERY'S FLAWLESS FINALE MLGTD @ KSC March 09, 2011, 10:57:15 CST 201103090001HQ. - Courtesy: Rob Navias/JSC-PAO

Continued...

EVE NTS: (Continued)

- FD5 MMT Decision: Based on FD2 inspection and RPM data, the TPS was cleared for entry per Flight Rule A2-142
- FD6: PMM, an extra storage room/closet, was installed and hatch opened.
- FD7: EVA2: Bowen & Drew successfully completed all tasks: Vent Ops/QD bag cleanup, Light Weight Adapter Plate Assembly (LWAPA) Retrieval & Install, P3 CETA Light Install, SPDM Camera Light Pan/Tilt Assy 1 Install and EP1 MLI Removal, and P1 Grapple Beam re-torque bolts down, plus several get-aheads. EVA2 duration 6:14.
- Transfers:
- 31,459 Pounds of H/W to ISS (inside & out)
 110 Pounds of Oxygen to ISS (Quest tanks)
 72 Pounds of Oxygen to ISS (stack repress)
 26 Pounds of Nitrogen to ISS
 931 Pounds of water to ISS
- 2,031 Pounds of middeck items to ISS
- 2,599 Pounds of HI/W (middeck only) returned to Discovery ISS Mass in space 919,964 Pounds 100 Percent ISS complete (pressurized volume)

- FD12: Undock from ISS complete at 066:12:00:10Z
- FD14:During entry comm outage times due to blackout were:
- 1st outage 068:16:39:25Z. INCO cmds H/O from TDRS 174 to TDRS 46 prior to roll cmd - at 068:16:30:25Z 1st outage ends.
- 2nd outage at 068:16:37:53Z. INCO cmds H/O back to TDRS 174 prior to 1st roll reversal - at 068:16:37:58Z 2nd outage ends. MILA AOS at 68:16:45:00Z good return link and UHF.

SIGNIFICANT ANOMALIES:

Orbiter

- TPS Anomalies
- ATVC Ch 1 Power Supply Failed to Restart
- Ammonia Spray Boiler Sys B Unexpected Switchover
- KSC, RSRM, SSME, MOD, SRB None.
- VIDEO FROM RH ET OBSERVATION CAMERA NOT RECORDED BY DAS DURING FLIGHT
- ET: (See Integration issues below)

Integration:

- ET Intertank Stringer Cracks
- Hydrogen Leak at ET Ground Umbilical Carrier Plate (GUCP)
- Unexpected Debris/Expected Debris Exceeding Mass Allowable Prior to Pad Clearance (Liftoff Debris)
- Debris Released From LH2 Flange Area Near the Bipod

FLT NO. ORBITER
STS133/ULF5 OV-103

----- SOME OF THE OPERATIONS SUPPORT TEAM ------



JSC2011-E-021930 - STS-133 Lead FD Bryan Lunney monitors rendezvous data. His last flight.



JSC2011-E-023001 --- STS-133 Orbit 1 FCT - Flight Director Bryan Lunney (center left) on 2nd row.



Jsc2011e023002 --- ISS Orbit 3 FCT - Orbit 3 - FD Chris Edelen (It) & CAPCOM Richard Arnold with STS-133 logo.



Ginger Kerrick/FD O2





JSC2011-E- 021648 -- Rt to Lt: FDs Tony Ceccacci & Richard Jones, & CAPCOMs Charlie Hobaugh & Barry Wilmore.



JSC2011-E-024279 --- STS-133 Ascent and Entry FCT in shuttle FCR in JSC. Flight Directors Tony Ceccacci (left) and Richard Jones hold the STS-133 mission logo.



IN KSC LCC: ABOVE: NASA Ctr Directors: (It to rt) are Patrick Scheuermann/Stennis, Bob Cabana/KSC, Mike Coats/JSC, & Robert Lightfoot/MSFC. BELOW: We have lift-off! (It to rt) Stephanie Stilson/Discovery Flow Director, Charlie Blackell-Thompson/Lead Test Director, & Mike Leinbach/ Launch Director.



STS-133/ULF5 "A MIXTURE OF SADNESS AND PRIDE"

JSC Center Director: "I am proud to have been the Pilot on the first flight of Discovery in 1984. I also flew Discovery on my two missions as Commander." - Mike Coats

Shuttle Program Manager/JSC: "Discovery's landing yesterday was an outstanding end to an amazing mission. I was really struck by the 'business as usual" attitude of the dedicated team that takes care of our Orbiters. ... To those team members that have flown their last flight with us – You should walk away with your head held very high. You have built and kept safe a unique capability in the most extreme of environments. I can only hope that others that come after us will look back at the Space Shuttle team and emulate the dedication, perseverance, and excellence that this team represents. If they do, we will have an outstanding human spaceflight program. For those team members remaining - Let's go finish this program strong." - John Shannon

STS-133 Crew: Nearing the end of the shuttle's final mission, the crew sentiments were a mixture of sadness and pride. "When you look out the Cupola window, times like that, I really reflect on what a great vehicle it's been – 39 missions, nearly one year on orbit, thinking about all the things the vehicle has done, it's kind of bittersweet." And later, "Houston for the last time, Wheels Stop!" - CDR Steve Lindsey. "She retires with all of the honors and dignity due any of those ships that made great discoveries. So I think we salute Discovery in that way, with all the accolades she deserves. But it also lays out a challenge. What will be the next ship named Discovery? The next ship to bear this name hopefully will go farther than this one and make every bit as much of a contribution to history and to discovery as this ship." - Michael Barratt/MS

Launch Director/KSC: "I'm going to take away the attitude of the team on the ground that safed the vehicle. They did that today just like they've done every mission. They didn't skip a beat today and that's a true testament to their work ethic. It was heartwarming. ... Proud of the people that put the vehicle together and the flight controllers in Houston that executed the mission." - Mike Leinbach

Lead Flight Director/JSC: "Discovery represents the ingenuity, creativity and diligence of the teams who originally designed and built Discovery and also the teams who operated and evolved the capabilities of Discovery across three decades. Discovery evolved from a short duration LEO delivery vehicle to a much more capable delivery and service spacecraft staying on orbit more than twice as long as originally intended. The engineering teams and operations teams expanded Discovery's capabilities well beyond the original designers intentions enabling scientists to learn more and more about the world and universe around us." - Bryan Lunney/Onyx Flight

NASA Assoc Admin. for Space Ops: "I don't really know what to say other than to thank the Discovery team. I think of all the processing work, the folks throughout the history of this vehicle back to Downey and Palmdale who gave us a phenomenal vehicle. It's legacy is the future with station in great shape and that's only possible because Discovery performed so well. That extra work sets up so well for the research period aboard station." - Gerst

DISCOVERY NOW HEADS TO THE SMITHSONIAN NATIONAL AIR AND SPACE MUSEUM'S UDVAR-HAZY CENTER IN CHANTILLY, VA.

Shuttle Legacy Mural - Hanging in LCC Firing Room at KSC



DISCOVERY TRIBUTE: From Mike Leinbach/Launch Director/KSC

(http://mediaarchive.ksc.nasa.gov/index.cfm). This KSC-2010-4453 Tribute Display features Discovery demonstrating the renowned Rendezvous Pitch Maneuver on approach to the International Space Station (ISS) during STS-114. Having accumulated the most space shuttle flights, Discovery's 39 mission patches are shown encircling the vehicle. The background image was taken from the Hubble Space Telescope, which was launched aboard Discovery on STS-31 and serviced by Discovery on STS-82 and STS-103. The prominent American flag and eagle represent Discovery's two "Return to Flight" missions, STS-26 and STS-114, and symbolize Discovery's heroic role in returning American astronauts to spaceflight. Discovery's significant accomplishments include the first female Shuttle pilot (Eileen Collins on STS-63), John Glenn's legendary STS-95 mission, and the celebration of the 100th space shuttle mission with STS-92. In addition, Discovery supported numerous DOD programs, satellite deploy/repair missions, and 13 flights for construction and operation of the ISS.









| FLT | ORBITER | CREW (6) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|--|--|-------------------------|--|---|--|--|------|--|--------------|---|---|
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, | THROTTLE PROFILE | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| SEQ FLT # 134 KSC-134 PAD 39A (57) MLP-2 36th SHUTTLE FLIGHT TO ISS | OMS PODS LPO3 -35 RPO4 -31 FRC5 -24 | | KSC 39A 136:12:56:28Z 8:56:28 AM EDT (P) 8:55:42 AM EDT (A) Monday (18) 05/16/11 (10) LAUNCH WINDOW: 5M 46S (Total) 5M01S (Preferred) EOM PLS: KSC TAL: ZZA TAL WX: MRN , FMI SELECTED: RTLS: KSC15 N/N | WINDS KSC15 KSC (77) 152:06:34:50Z 01:34:50 AM CDT Wednesday (18) 06/01/11 (9) DEORBIT BURN: 152:05:29:03Z XRANGE:141.1 NM ORBIT DIR: A/L (46) AIM PT: Nominal MLGTD: 3138 FT 152:06:34:50Z VEL: 196 KGS 191 KFAS | ENG. S.N. 104/104/ 109% PREDICTED: 100/104.5/104.5/ 72/104.5 ACTUAL: 100/104.5/72/ 104.5 1 = 2059 (5) 2 = 2061 (2) 3 = 2057 (6) M 3 EOM: WEIGHT: 204532 LBS X CG: 1080.4 IN LANDING: WEIGHT: 204463 LBS X CG: 1082.3 IN | BI-145 RSRM- 113 ET-122 SLWT 42 W/Stringer Mod ET IMPACT 1:14:11 MET LAT: 36.436S LONG: 158.531W | (36) | DIRECT INSERTION POST OMS-2 175.9x124.7 NM DEORBIT HA 188.7 NM HP 23.1 NM ENTRY VELOCITY: 25860 FPS ENTRY RANGE: 4419 NM | O1-34 (6) | CARGO: 39210 LBS PAYLOAD CHARGEABLE: 31693 LBS DEPLOYED: 30721 LBS NON-DEPLOYED: 811 LBS MIDDECK: 161 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 1759961 LBS NON-DEPLOYED: 1630249LBS CARGO TOTAL: 4365726 LBS PERFORMANCE MARGINS (LBS): FPR: 2821 FUEL BIAS: 954 FINAL TDDP: 1968 RECON: 3211 PAYLOADS: PLB: ISS-UL F6 (AMS-02 ELC 3) MISSE 7 Return MISSE 8, STORRM DTO-703 MIDDECK: ISS-UL65, MAUI, SEITE, SIMPLEX, RAMBO-2 | Brief Mission Summary: The STS-134 (36th mission to ISS) delivered the \$2 billion Alpha Magnetic Spectrometer-2 (AMS-02) to the ISS. AMS-02 is a particle physics detector designed to search for dark matter and for antimatter (first discovered by British physicist Paul Dirac in 1920's) in the universe. MIT Prof. Sam Ting is the AlMS Principal Investigator. ISS spare parts and a suite of DoD Experiments were also delivered to orbit. Four EVA's were conducted for ISS maintenance and the Orbiter OBSS was transferred to ISS as a permanent fixture. This was the final flight of Endeavour (25 flights). KSC WID OPF: 263 days+ 89 Non-work days + 17 holidays + 2 safety days VAB: 9 +1C (Contingency) day + 1Wx PAD A: 53+14C Total Work Days = 325 (OPF processing occurred over a total time period of 371 days) POSTPONEMENTS: - Baselined STS-134 to FDRD - launch date of 07/29/10 on 06/30/09. - Ppd. to 11/26/10 on 07/01/10. Delayed to late November after a decision to replace the magnet at the heart of the Alpha Magnetic Spectrometer payload. - Ppd. to 02/26/11 on 07/01/10. A late-November/early December launch was ruled out because of conflicts with other planned station launches. Temperature constraints related to the station's orbit prevented a launch in January and range conflicts with other unmanned missions pushed the approved launch date to Feb. 26. - Ppd. to NET 04/01/11 on 12/03/10 due to STS-133 slip for ET stringer problems. - Ppd. to NeT 04/01/11 on 04/04/11. This date was driven by the launch pad turnaround time required after STS-133 launch. - Ppd. to 04/19/11 on 04/04/11 due to conflicts with Russian Progress vehicle flight to ISS. LAUNCH SCRUBS: - Launch scrubbed on 04/29/11 due to failed APU fuel line heater. Launch rescheduled for NET 05/02/11. On 05/02/11 launch was initially rescheduled to NET 05/08/11, then later to 05/10/11 to allow time to R&R faulty Load Control Assembly (LCA) box. On 05/06/11 managers announced earliest launch date was now 05/16/11 pending resolution of additional electrical t |
| | | Continued | | ENDE | AVOUR'S | FINAL | LIF | Γ-OFF | | Continued | Continued |

| | | | SP | ACE SHU | JTTLE I | MISS | SIOI | NS SU | MM | IARY | Page 2-241 - STS- |
|--|---------------------------------------|--|---|---|---|--------------------|-------------------|----------------|-------------------|---|---|
| FLT NO. | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, LANDING SITES, | LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES | SSME-TL NOM-ABORT EMERG THROTTLE | SRB RSRM AND | INC | ORBIT HA/HP | FSW | PAYLOAD WEIGHTS, PAYLOADS/ | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, |
| | | TITLE, NAMES & EVA'S | ABORT TIMES | FLT DURATION, WINDS | PROFILE ENG. S.N. | ET | | | | EXPERIMENTS | FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS- 134/ULF6 | OV-105 | Continued | Continued SE TAL (ZZA 104): | Continued | | 11 | | | | Continued | Continued |
| Continued | | SS EVA 162 DOCKED QUEST EVA 80 EMU/TETHERED EVA 155 SCHEDULED EVA 153 DURATION 7:24:15 | | DRAG CHUTE DEPLOY: 184 KEAS 152:06:34:53Z NLGTD: 6034 FT | 7//// | Christopher Conti | Kraft, | Jr. er | T | 5 CRYO TANK SETS, ODS, SRMS (90) OBSS Remains on ISS, SSPTS | LAUNCH WINDOW: Window open at 136:12:55:43Z and close at 136:13:01:29 Preferred Launch Time was 136:12:56:28 (In-Plane Time) launch window of 5M01S (preferred). |
| | : arry Wilmore hambault/Wx | MCC WHITE FLIGHT FCR (63) FLIGHT DIRECTORS: SHUTTLE: Ascent: Richard Jones | SE PRESS 104 6:54(P) 6:55 (A) MECO CMD: 8:21.8 (P) 8:21.5 (A) | 152:06:34:54Z VEL: 154 KGS 149 KEAS HDOT: - 4.5 FPS | | | 7 | | 1 | | LAUNCH DELAYS: None. TAL WEATHER: Spaceflight Meteorology Group (SMG) rat least one site would have favorable weather. High press gave mostly clear skies at ZZA & FMI, but head winds neal limit at FMI. Moron reported concerns for thunderstorms. |
| LD/O1 - Me O2 - Steve Planning: - Shann Entry - Barr | gan McArthur Robinson non Lucid | LD/O1 - Gary Horlacher O2- Paul Dye O3 & Prelaunch - Kwatsi Alibaruho O4 - Rick LaBrode Entry - Tony Ceccacci | <u>VI</u> : 25819(P) 25818(A) <u>OMS-2</u> : 37:00 (P) 36:57(A) 260(P) 259(A) FPS | BRK INIT: 119 KGS DRAG CHUTE JETTISON: 152:06:35:19Z 47 KGS | renamed in 14, 2011. | rom JSC honor o | Missi of Chris | ion Control | Cente Kraft, J | r after it was Ir. on April | was selected as prime TAL site for launch. The slight char thunderstorms at MRN was removed one hour before laungiving Mission Control Team two acceptable TAL sites with marginally acceptable. PERFORMANCE ENHANCEMENTS |

- Terry Virts/Wx

Team 4 - N/A

LD/O2 - Lucia

O3 - Dan Tani

McCullough

O1 - Rob hayhurst

MOD – John Mccullough

Team 4 - Richard Jones

LD/O2 - Derek Hassmann

<u>ISS</u> O1 - Dana Weigel

O3 - Dina Contella

Team 4 - Dave Korth

S134-E- 7189 - AMS In the grasp of the Orbiter's robotic Canadarm for transfer to ISS.



MIT Professor Sam Ting the Principal Investigator for the \$2 Billion AMS-02 in search of cosmic dark matter & antimatter. (AMS-01 was flown & tested on STS-91.)

ROLLOUT: 6574 FT 0:42 M:S

BRK DECEL FPS2:

AVE 8.3 PK 11.7

152:06:35:32Z

9712 FT

WHEELS STOP:

WINDS: -2 H KTS 0 KTS OFFICIAL: 32002P03KT(X1P1 T2P3)

DENS ALT: 844 FT

FLT DURATION: 15:17:38:22

1305:21:45:26

<u>OV-105:</u> 296:03:17:45

Continued...

BELOW: Jsc2011e036646 -- Chris speaks at the ceremony. He was NASA's 1st Flight Director for manned spaceflight. He served on all Mercury & several Gemini flights, was one of the designers & implementers of the MCC, and was JSC Center Director from 1972 to 1982. Call Name - Red Flight.



at 136:13:01:297 (In-Plane Time) for a

Group (SMG) reported ther. High pressure head winds near thunderstorms. ZZA The slight chance of hour before launch ole TAL sites with FMI

PERFORMANCE ENHANCEMENTS Include the standard set plus: 1) PE Operational High Q -TRN/APR, 2) OMS Assist, 3) a 52 nautical mile MECO, & 4) Del

FLIGHT DURATION CHANGES: None.

FIRSTS/LASTS/MOSTS:

Last flight of Endeavour.

First flight controlled from JSC MCC renamed for Dr. Christopher

C. Kraft, Jr. on April 14, 2011.

- First Papal call to space. On Saturday, May 21, 2011 Pope Benedict XVI commended crews for their courage and blessed them with prayers.

- First undock of Soyuz while Shuttle is docked to ISS. Leagcy photo by Soyuz of ISS with Docked Shuttle.
- Last EVA's of Shuttle crew. Feustel, Chamitoff, & Fincke

through 4 EVA's. "We will be traversing from one end of the station to the other," said Feustel.

- Most time in space by an American: Mike Fincke surpassed Peggy Whitson's record of 377cumulative days finishing with 382 days.

NIGHT LAUNCH: N/A

NIGHT LANDING KSC #18: (#24 in Shuttle history)

RENDEZVOUS: #80 Rendezvous and dock with ISS.

Continued...

| F | FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|---|-----|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| N | VO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE FNG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |

STS-134/ULF6

Continued.

Crew "Star Trek" Connection



S134-E-009631-- EVA 4 Fincke (Below)

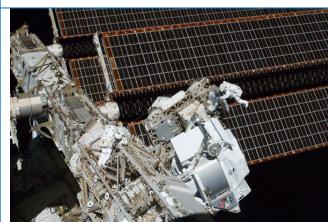


Continued...

DISTANCE: 6,510,221 sm

TOTAL OV-105 DISTANCE 122,883,151 sm

TOTAL SHUTTLE DISTANCE: 536,308,104 sm \$134-E-009265 -- EVA-1 Feustel (rt) & Chamitoff (lt)



ISS027-E-035698 --- Crews STS-134 (in Black) & EXP 27 (in Blue) pose in ISS Kibo: It to rt (front row) are Paolo Nespoli/ESA, CDR Dmitry Kondratyev/RSA, CDR Kelly & Vittori/ESA; and (back row), Cady Coleman, Andrey Borisenko/RSA, Alexander Samokutyaev/RSA, Ron Garan, Fincke, Feustel/ESA, Chamitoff & PLT Johnson.

Continued...

CDR Mark Kelly's wife & U.S. Representative Gabrielle Giffords severely wounded in a shooting at a public event in Tucson, Arizona on Jan. 8, 2011, was able to attend the launch.

EVE NTS:

- FD1: OMS2 ignition at 136:13:33:25Z resulted in a 175.9 by
- FD2: RCC surveys showed some areas of concern. Focus Inspection required on FD6
- T1 maneuver at 138:07:38:13Z resulted in a 186.1 by182.8 NM
- FD3: Performed R-Bar Pitch Maneuver.
- Docking Contact occurred at 138:10:13:52Z
- Hard Dock, hooks closed, occurred at 138:10:25:15Z
- ISS Hatch opened at 6:38 AM CDT May 18, 2011.
- FD4: AMS handed off from Shuttle arm to ISS arm and installed on ISS. Scientists immediately began detecting "thousands and thousands" of subatomic particles from deep space.
- FD5: DAT team cleared ascent RCC damage, but recommended a Focused Inspection of area between MLGD & ET door. MMT approved for FD6.
- FD5: EVA 1: Feustel & Chamitoff completed Installation & retrieval of MISSE experiments, & installations of: S3 CETA light. SARJ cover 7, P3/P4 ammonia jumper on ISS. Chamitoff's ppCO2 sensor dropped out during EWC antenna task. Flight rule required termination of the EVA. EVA1 duration 6:19
- FD6: Focused Inspection was completed. DATteam analysis using these images cleared TPS for safe entry.
- FD7: EVA 2: Feustel & Fincke completed all tasks, however, duration was 1:30 longer than planned due to H/W issues. During port SARJ lube task some loose bolts prevented removal of 2 covers & reinstallation of another. Also, after filling P6 truss PVTCS one ammonia flake was seen near Fincke's suit. Inspections revealed no visible contamination. Other tasks included SPDM LEE lube & S1 Radiator Stowage Beam installation. EVA2 duration 8:07.
- FD8: GMT 143/21:35 Soyuz TMA-20 undocking from ISS & imagery operations of Shuttle docked to ISS.
- FD10: EVA3: Feustel & Fincke completed all tasks for servicing of ISS, installing cables for the power system & completion of work on a wireless communications system. EVA3 duration 6:54.
- FD10 the OBSS will be left behind to serve as an extension for station use if needed in the future.

Continued.





S134-E-009647 -- EVA 4 Chamitoff (Above)

STS-134/ULF6



FD 7: JSC2011-E-046603 (21 May 2011) --- This overall view of the space shuttle FCR in the Christopher C. Kraft, Jr. Mission Control Center was taken during a special call from Pope Benedict XVI (upper left) in the Vatican to the STS-134 and Expedition 27 crews (center screen) on the ISS.



JSC2011-E-050144 --- CAPCOMs Terry Virts (left) and Barry Wilmore on console in CCK-MCC.



FD 11: May 25, 2011 the 50th Anniversary of President John F. Kennedy's historic space message to a joint session of Congress, on May 25, 1961.

"...I believe this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the Moon and returning him safely to the Earth."

And ending with... "We have a long way to go in this space race. But this is the new ocean, and I believe that the United States must sail on it and be in a position second to none."

America has sailed this ocean for the past 50 years, and grabbed the lead on July 20, 1969. The question now is: will she still be the lead ship on this ocean for the next 50 years?

MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

Continued...

EVENTS: Continued

- FD12: EVA 4: Fincke & Chamitoff completed all major objectives including: OBSS Stow on ISS, P6 PGDF Retrieve, & OBSS EFGF/PDGR Swap. Only items not completed: relocation of APFR from P6 and stowing EFGF on Tool Stowage Assembly (TSA) in Shuttle P/L Bay. EVA4 duration 7:24:15. This was last EVA of the Shuttle era.

FD14: ISS reboost with 14-min Orbiter RCS Verniers completed for 1.8 fps burn.

Transfers:

29,370 pounds of H/W to ISS
17 Pounds of Oxygen to ISS (Quest tanks)
278 Pounds of Oxygen to ISS (stack repress)
18 Pounds of Nitrogen to ISS
2,266 Pounds of middeck items to ISS
2,235 Pounds of middeck returned to Ende

ISS Mass in space 904,991 Pounds

-FD15: Undock from ISS complete at 150:03:55:12Z
- FD15: Completed DTO for new docking system - Sensor Test for Orion Relative Navigation Risk Mitigation (STORRM) - "Went exceptionally well." Anthony Ceccacci/FD.

- FD16: No significant comm outage during blackout timeframe.
- FD16: No significant comm outage during blackout timeframe.
- Start of RF Blackout: MET 15/17:09, good comm on TDRS-174
- Orbiter upper antennas. 1st Roll Maneuver: MET 15/17:11, still on upper antenna & good comm. 1st Roll Reversal: MET 15/17:20, INCO handoff to TDRS-46, still on uppers & good comm. Hand down to MILA: MET 15/17:25.

SIGNIFICANT ANOMALIES:

Orbiter: - RH NLG P2 Pressure Measurement(V51P0373A) Erratic/Off

- RH NLG P2 Pressure Measurement(V51PU3/3A) Erratic/Off Scale High During Ascent - DURING PRE-LAUNCH OPERATIONS ON APRIL 29, AUXILIARY POWER UNIT (APU) 1 FUEL TEST LINE AND FUEL SERVICE LINE B HEATERS FAILED TO ACTIVATE (TEMPERATURE TRENDED BELOW THE LCC LIMIT OF 45 DEG F IN LCC APU-14) WITH BOTH GROUND COMMAND AND PANEL SWITCH ACTIVATION.

SRB:
- RH SRB MAIN CHUTE FAILURE ? GORE 26 FAILED FROM
THE SKIRT BAND THROUGH THE VENT BAND.

KSC, RSRM, SSME, MOD, & ET - None.

Integration:

- Unexpected Debris/Expected Debris Exceeding Mass Allowable Prior to Pad Clearance (Liftoff Debris) - Cylindrical Debris Observed Near +Y Thrust Panel During SRB

----- SALUTE TO ENDEAVOUR AND ITS FLIGHT CREW ------



FD 8: iss027e036679 (May 23, 2011) ---- One of first legacy photos taken from Soyuz TMA-20 of a Shuttle (Endeavour, left of center) docked to ISS.



ABOVE: STS134-070 (1 June 2011) --- After 19 years of service, xenon lights illuminate Endeavour's drag chute during it's last landing & Shuttle's last night landing.

BELOW: 201106010004hq (1 June 2011) --- Crew poses in front of Endeavour post- landing: (Lt to Rt) Vittori, Johnson, CDR Kelly, Fincke, Chamitoff, & Feustel.



STS-134/ULF7 ----- SALUTE TO ENDEAVOUR AND SOME OF ITS OPERATIONS SUPPORT TEAM -----



TOP: JSC2011-E-048881 --- STS-134 Orbit 3 FCT. FD Kwatsi Alibaruho (left) on the front row.

BOTTOM: JSC2011-E-048941 --- Entry FCT. FD Tony Ceccacci (third from left) on the front row with CAPCOM Barry Wilmore holding STS-134 mission logo.



Shuttle Legacy Mural - Hanging in LCC Firing Room at KSC



ENDEAVOUR: From Mike Leinbach/Launch Director/KSC

KSC-2010-4454 (http://mediaarchive.ksc.nasa.gov/index.cfm). This Tribute Display features Endeavour soaring into orbit above the sailing vessel HMS Endeavour for which the orbiter was named. The Cupola, delivered to the International Space Station by Endeavour on STS-130, is shown framing various images of Endeavour. The images represent the phases of mission processing and execution for the Space Shuttle Program. The first ever use of a drag chute during orbiter landing (STS-49) is depicted in the top window and moving clockwise the images symbolize the following: Rollout to the Pad. Ferry Flight return to Kennedy Space Center, Orbiter Processing Facility Roll-in, Docking at the International Space Station, and Lifting Operations for Orbiter Mate in the Vehicle Assembly Building. The background image was captured by the Hubble Space Telescope and signifies the first servicing mission which was performed by the Endeavour crew on STS-61. Crew-designed patches from Endeavour's maiden voyage through her final mission are shown ascending toward the stars.



FD LD/O1 Gary Horlacher (left) & Chief FD John McCullough

FD O4 Rick LaBrode





Kelly Humphries/PAO







An unprecedented view, as seen by the ISS Exp 28 crew, of Space Shuttle Atlantis on its way home with its plasma trail generated during the heat of entry. Airglow over Earth and stars can be seen in the background.

(ISS028-E-018214)

Continued..

SPACE SHUTTLE MISSIONS SUMMARY

| | | | OI. | AOL OIR |) | | | 110 00 | | | |
|--|---|--|---|---|---|---|-----------|--|--------------|--|--|
| FLT | ORBITER | CREW (4) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | 1011 | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS- 135/ULF7 SEQ FLT # 135 KSC-135 PAD 39A (58) MLP-3 37th SHUTTLE FLIGHT TO ISS | OV-104 (Flight 33) ATLANTIS LAST FLIGHT OF SHUTTLE PROGRAM OMS PODS LP04 -32 RP01 40 FRC4-32 | PLT Doug Hurley (Flt 2 - STS-127) P848/R358/V227/M295 MS 1 Sandy Magnus Flt3- STS-112, (UP ON STS-1126, stay ISS, DN on STS-119) P849/R284/V200/F36 MS 2 Rex Walheim (Flt3 - STS-110, STS-122) P850/R277/V193/M243 SS EVA's No SS EVAs were scheduled for this flight. (There was an ISS Crew EVA by Michael Fossum & Ronald Garan during this mission for a duration of 6:31 hr:min) | KSC 39A 189:15:29:04Z 111:26:46 EDT (P) 11:29:04 EDT (A) Friday (29) 07/08/11 (16) LAUNCH WINDOW: 9M6S (Total) 4M33S (Preferred) EOM PLS: KSC TAL: ZZA30L TAL WX: MRN , FMI SELECTED: RTLS: KSC15 N/N TAL: ZZA30L N/N AOA: NOR17 N/N 1ST DAY PLS: EDW22 N/N TDEL: 0.000 (P) 0.082 (A) MAX Q NAV: 745 (P) 734 (A) | KSC15 KSC (78) 202: 09:56:58Z 4:56:58 AM CDT Thursday (12) 07/21/11 (13) DEORBIT BURN: 202:08:49:04Z XRANGE:385.1 NM ORBIT DIR: A/L (47) AIM PT: Nominal | 104/104/ 109% PREDICTED: 100/104.5/104.5/ 72/104.5 ACTUAL: 100/104.5/72/ 104.5 1 = 2047 (15) 2 = 2060 (3) 3 = 2045 (12) | BI-146 RSRM 114 ET-138 SLWT 43 w/Stringer Mod ET IMPACT 1:13:58 MET LAT: 36.871S LONG: 159.695W | 51.6 (37) | DIRECT INSERTION POST OMS-2 124.3x84.9 NM DEORBIT HA 209.8 NM HP 25.3 NM ENTRY VELOCITY: 25902 FPS ENTRY RANGE: 4407 NM | OI-34 (7) | CARGO: 37534 LBS PAYLOAD CHARGEABLE: 30425 LBS DEPLOYED: 27997 LBS NON-DEPLOYED: 2137 LBS MIDDECK: 291 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 1787958 LBS NON-DEPLOYED: 1632677 LBS CARGO TOTAL: 4403260 LBS PERFORMANCE | Brief Mission Summary: With U.S. Congress approval NASA flies one more flight. STS-135 "The Final Mission" (37th mission to ISS) delivered supplies and logistics to ISS via the Raffaello Multi-Purpose Logistics Module and the middeck cargo area. Purpose of these supplies and spare parts was to provide "sustenance of the [ISS] and its crew in the post-shuttle era" [excerpt from PAO press Kit]. The mission also flew the Robotic Refueling Mission (RFM) an experiment to demonstrate robotically refueling of satellites. This final flight of Atlantis and of the 30-year Space Shuttle Flight Program was witnessed by an estimated crowd of one million people. KSC W/D OPF: 242 days +96 Non-work days +17 H (holiday) VAB-1: 9 + 4C (Contingency) days +1H PAD A: 35+2C+1H Total Work Days = 286 (OPF processing occurred over a total time period of 355 days) POSTPONEMENTS: - Baselined STS-135 to FDRD - Revised STS-335 rescue mission to STS-135 on 01/31/11 with launch date of 06/28/11. - Ppd. to 07/08/11 on 05/24/11 due to STS-134 slip. LAUNCH SCRUBS: None. LAUNCH WINDOW: Window open at 189:15:22:13Z and close at 189:15:31:19Z Preferred Launch Time was 189:15:26:46Z (In-Plane Time) for a |
| | ne Katrina sy Lockh | x" recovered from | SRB STG: 2:02.8 (P) 2:03.0 (A) PERF: NOMINAL 2 ENG TAL (MRN): 2:32 (P) 2:37 (A NEG RET (2@ 104): 3:54(P) 3:55(A PTA (U/S 157 FPS): 5:02(P) 5:07(A) SE TAL (ZZA 104): 6:02 (P) 5:59(A) Continued | FINAL | L LIFT-OFF ally 8, 2011 | at 11:29 a (STS-13 | | | | MARGINS (LBS): FPR: 2821 FUEL BIAS: 954 FINAL TDDP: 1987 RECON: N/A PAYLOADS: PLB: ISS-UL F7 (MPLM, LMC), TRIDAR AR&D SENSOR, DTO- 701A, PSSC MIDDECK: MAUI, SEITE, SIMPLEX, RAMBO-2 5 CRYO TANK SETS, ODS, SRMS (91) OBSS, SSPTS, APCUS, ROEU | launch window of 4M33S (preferred). LAUNCH DELAYS: Held at T-31 seconds for 2M 18S to confirm GOX vent arm retracted. Note: Holding @T-31 sec was "inside of drain back" which further limited the available window to 3M16S. Launch occurred with 58 Sec remaining in that launch window. TAL WEATHER: Spaceflight Meteorology Group (SMG) reported weather at TAL sites was "Solid GO" with clear skies & light winds at Moron, Spain and only a few low clouds & winds within flight rules at Zaragoza, Spain & Istres France. RTLS weather was NO GO through out the countdown due to showers within 20nm of SLF. Mark McDonald, Flight Dynamics Officer (FDO), was asked & concluded there would be enough energy to fly through a rain shower upon re-entry. The FD, Richard Jones, waived the RTLS weather flight rule and proceeded with launch countdown. PERFORMANCE ENHANCEMENTS Include the standard set plus: 1) PE Operational High Q - SUM/JUL, 2) OMS Assist, 3) a 52 NM MECO, & 4) Del Psi. |

CDACE CHITTLE MICCIONIC CLIMMADV

| | | | 5P | ACE SHU | JIILEI | VII 22 | | N2 20 | IVIIV | IART | 1 age 2-2-0 - 010-100 |
|-------------------------------|-------------|--|---|--|---|----------------|---------------|-------------------------------|------------------|--------------------------|---|
| FLT | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
| NO. | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |
| STS- 135/ULF7 Continued | | Continued MCC WHITE FLIGHT FCR (64) FLIGHT DIRECTORS: | Continued PTM (U/S 180 FPS): 6:14(P) 6:23(A) | Continued MLGTD: 1649 FT 202:09:56:58Z | Continued M 3 EOM: WEIGHT: 226333 LBS | becor crews | ne a t | radition for S 3-135 & ISS | Shuttle Exp 2 | 8 crews | Continued FLIGHT DURATION CHANGES: On FD4, MMT agreed to add 1 day to mission, stating: "Additional mission content would benefit ISS transfer and utilization". |
| SHUTTLE Ascent - Ba | rry Wilmore | SHUTTLE: Ascent - Richard Jones LD/O1 - Kwastsi Alibaruho O2- Rick LaBrode | <u>SE PRESS 104</u> 6:52(P) 6:55 (A) | VEL: 221 KGS 216 KEAS HDOT: -2.1 FPS | Xcg: 1090.7 IN <u>LANDING</u> : WEIGHT: 226270 LBS | aboar crew | d JA consi | | orato astro | | FIRSTS/LASTS/MOSTS: - Last flight of Atlantis & Space Shuttle Program Sandra Magnus is "Last Woman to Blast Off" in Space Shuttle |

226270 LBS

Xcg:1092.4 IN

O2 - Megan McArthur Planning: - Shannon Lucid Entry - Barry Wilmore - Charlie Hobaugh/Wx Team 4 - N/A ISS

LD/O1 - Steve Robinson

O1 - Dan Tani LD/O2 - Rob Havhurst O3 - Kathy Bolt Team 4 - N/A

O2- Rick LaBrode Planning - Paul Dve Entry - Tony Ceccacci MOD – John Mccullough Team 4 - N/A O1 - Jerry Jason LD/O2 - Chris Edelen O3 - Courtenay Team 4 - N/A

MECO CMD: 8:23.5 (P) 8:23.8 (A) 25819(P) 25817(A)

OMS-2:

202:09:57:037 37:46 (P) 37:45(A) 98.7(P) 96.8(A) FPS NLGTD: 6713 FT 202:09:57:11Z VEL: 156 KGS 146 KEAS HDOT: - 6.6 FPS

TD NORM 205:

DRAG CHUTE

DEPLOY:192 KEAS

2809 FT

BRK INIT: 118 KGS DRAG CHUTE

JETTISON: 52 KGS 202:09:57:35Z

BRK DECEL FPS2 AVE 6.8 PK 8.0

WHEELS STOP: 202:09:57:497 11,361 ROLLOUT: 9712 FT 0:51 M:S

WINDS: -1 H KTS 0 KTS OFFICIAL: 33001P02KT (X0P0 T1P2)

DENS ALT: 1239 FT

Continued...

Ferguson, Doug Hurley, Sandy Magnus and Rex Walheim; Exp 28 crewmembers

are JAXA astronaut Satoshi Furukawa, NASA astronauts Ron Garan and Mike Fossum, and Russian cosmonauts Andrey Borisenko, Alexander Samokutyaev and Sergei Volkov. Shuttle & ISS CDRs Ferguson and Borisenko are in the 12 o'clock & six o'clock positions, respectively, on the circle. The U.S. flag pictured was flown on the first Space Shuttle mission, STS-1, and flew on this mission to be presented to the ISS crew. It will remain on board until the next crew launched [commercially] from the U.S. will retrieve it for return to Earth. It will fly from Earth again, with the crew that launches from the U.S. on a journey of exploration beyond Earth orbit.

Sandra Magnus is "Last Woman to Blast Off" in Space Shuttle. First iPhone launched into space to run an experimental app

designed by Odyssey Space Research.

NIGHT LAUNCH: N/A

NIGHT LANDING KSC #19: (#25 in Shuttle history)

RENDEZVOUS: #81 Rendezvous and dock with ISS.

EVE NTS:

- FD1: OMS2 ignition at 189:16:06:49Z resulted in a 124.3 by 84.9 NM orbit.

FD2 Wakeup: "Viva la Vida" by Coldplay for Doug Hurley (w/greeting from MSFC employees)

RCC survey data collected for DAT. Go to MMT on FD4.

- T1 maneuver at 191:12:29:04Z resulted in a 210.5 by 207.3 nm
- FD3: Performed R-Bar Pitch Maneuver.
- Docking Contact occurred at 191:15:07:15Z
- Hard Dock, hooks closed, occurred at 191:15:19:32Z
- ISS Hatch opened at11:47 AM CDT July 10, 2011.
- FD4: MMT agreed to add 1 day to mission. "Additional mission content would benefit ISS transfer and utilization."
- MPLM installed on ISS
- FD5: MMT concurred with DAT assessment that Orbiter TPS was cleared for deorbit, entry, & landing.
- ISS crewmembers Mike Fossum & Ron Garan conduced EVA completing the following activities: Readied Pump Module in P/L Bay for return, RRM installed on SPDM EOTP, MISSE 8 ORMATE installed, FGB PDGF exposed grounding wire corrected, & PMA3 cover installed. PET duration 6 hrs 31 minutes
- FD7: GPC 4 (SMGPC) failed most likely cause was a transient single event upset (radiation hit). Same event occurred on STS-71 (same vehicle & same GPC).
- FD 8: GPC 2 was reconfigured as SM GPC.
- FD 10: GPC 4 reconfigured to SM and treated as fully functional for Entry.

Continued.



ISS028-E-015565 Atlantis as seen from ISS brings supplies & spare parts to ISS packed in MPLM at rear of P/L Bay. Last flight of the "Banana Truck"! [Atlantis was happily called the "Banana Truck" on STS-71 by Cosmonaut Strehalov, see page 2-84.]

| FLT NO. | ORBITER | CREW (7) | LAUNCH SITE, LIFTOFF TIME, | LANDING SITE/ RUNWAY, CROSSRANGE | SSME-TL NOM-ABORT EMERG | SRB RSRM | | ORBIT | FSW | PAYLOAD WEIGHTS, | MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, |
|----------------|---------|-------------------------|-------------------------------|---|----------------------------------|-------------|-----|-------|-----|--------------------------|--|
| S-135/ ILF7 | | TITLE, NAMES & EVA'S | LANDING SITES, ABORT TIMES | LANDING TIMES FLT DURATION, WINDS | THROTTLE PROFILE ENG. S.N. | AND ET | INC | HA/HP | | PAYLOADS/ EXPERIMENTS | TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.) |



S135-E-006297 --- Chris Ferguson, left, and Doug Hurley are pictured at the Commander's Station and Pilot's Station, respectively.

Continued... FLT DURATION: 12:18:27:56

1318:16:13:22

OV-104: 307:12:55:07

DISTANCE: 5.284.862 sm

TOTAL OV-104 DISTANCE 125,935,769 sm

TOTAL SHUTTLE DISTANCE: 541,592,966 sm ISS028-E-017042 --- Sandy Magnus/ MS enjoys view in the panoramic Cupola, an ISS addition since her last visit.



Continued..

Transfers:

30,576 lbs of h/w to ISS - MPLM, LMC, RRM & Picosat 28,100 lbs of h/w from ISS MPLM LMC, & PM

2,977 LtWt MPESS Carrier (up mass)

1.409 LtWt MPESS Carrier (down mass)

550 Robotic Refueling Mission P/L mass

8 PicoSat mass (final deplow from a Shuttle - the 180th)

65 lbs of Oxygen transferred to ISS (stack repress)

111 lbs of Nitrogen transferred to ISS (stack repress)

1.652 lbs of water transferred to ISS

1.283 lbs of Atlantis middeck items transferred to ISS 723 lbs of Atlantis middeck items returned from ISS ISS Mass in space 901,745 Pounds

ISS assembly (pressurized volume) 100% complete

FD12: Undock from ISS complete at 200:06:27:58Z

FD13 did not have an LOS due to black out but if we had been on a lower antenna we estimated blackout to be GMT 202/09:28 -202/09:41.

SIGNIFICANT ANOMALIES:

Orbite:
- WLEIDS SENSOR UNIT 1111 DROPPED OUT OF OOM
PREMATURELY
- WLEIDS SENSOR UNIT 1080 HAD COMMUNICATION DROP

- GPC 4 (SM) AR5450 SRB, KSC, RSRM, SSME, ET, Integration & MOD: None.

A Shuttle Goodbye to ISS





S135-E-007515 --- With his feet secured on a restraint on the ISS robotic arm or Canadarm2, Ron Garan/ Exp 28 Flight Engineer, carries the pump module,



S135-E-007457: -- Rex Walheim, Mission Specialist, works on the aft flight deck of Space Shuttle Atlantis.



S135-E-007637 --- Close-up of Mike Fossum/ Exp 28 Flight Engineer, as he participates in the July 12 six and a half hour spacewalk on ISS.

----- SALUTE -----



"God Bless America" sung by the unmistakable Kate Smith signaled the start of landing prep. FD Paul Dye, CapCom Shannon Lucid (in rear center) and the rest of the team in the CCK MCC MOCR stood during the song, which was played for the crew and all those who have worked for the Space Shuttle Program. (From PAO)



Entry Flight Control Team in Shuttle FCR in CCK MCC. FD Tony Ceccacci (center front) holds STS-135 mission logo.

(JSC2011-E-067253)



ROSES FOR CCK MCC

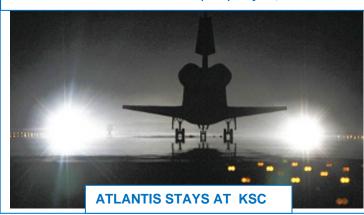
Seated on INCO console with Atlantis model is a bouquet of roses sent once again by the Shelton & Murphy families of North Texas. See history of "MCC Roses" given on flight STS-119/14A (page 2-203).

(JSC2011-E-063867)



Space Shuttle's Last Landing Path (From PAO)

FINAL LANDING at 5:57 a.m. (EDT) July 21, 2011





CDR Ferguson has a big smile for the thermal tiles (JSC2011-E-067990)



JSC2011-E-067473-- In MOCR in CCK MCC Michael Lopez-Algeria (left) Director/Flight Crew Ops for ISS shakes hands with Ascent FD Richard Jones. In middle (I to r) are Paul Hill/ Director/MOD, John Mccullough/Chief FD Office & Norm Knight/Dep Ch FD Office.



JSC2011-E-070840 --- STS-135 Ascent flight control team and flight crew (black shirts) in shuttle flight control room in the CCK MCC. Flight Director Richard Jones (left) and CDR Chris Ferguson, STS-135 Commander, hold the mission logo.



JSC2011-E-064806 --- STS-135 Shuttle & ISS FD's in the shuttle FCR in CCK MCC at JSC. From left (front row) are Tony Ceccacci, Courtenay McMillan, Chris Edelen, Kwatsi Alibaruho, Gary Horlacher, and Rick LaBrode. Back row are Paul Dye, Royce Renfrew, Richard Jones and Jerry Jason.



JSC2011-E-062692 --- STS-135 Orbit 1 FCT group portrait. Flight Director Kwatsi Alibaruho (center) stands on the front row.



JSC2011-E-063635 --- STS-135 Orbit 2 FCT group portrait. Flight Director Rick LaBrode holds the STS-135 mission logo.



JSC2011-E-064789 --- STS-135 Orbit 3 FCT group portrait. FD Paul Dye is in front near Shuttle model & MCC Roses.



JSC2011-E-063846 --- Shannon Lucid, STS-135 Planning Shift CAPCOM. She was one of NASA's first six women astronauts.

On behalf of the Astronaut Office...

Now that Atlantis and the final Shuttle crew have safely returned to planet Earth, we are all feeling the finality of 30 years of Space Shuttle flights. ... While the Shuttle is an incredible, one-of-a-kind flying machine, the most important thing that this program has given us is wrapped up in all the people and expertise that turned a concept into something real. ... We are exceptionally honored to have flown with all of you as part of the Shuttle Program, and look forward to the continuation of our journey on board the International Space Station and beyond.

Peggy A. Whitson STS-111/Exp 5/STS-113, ISS Exp 16 CDR **Chief. Astronaut Office**

This plaque flew on the final Space Shuttle Mission in July, 2011. From the fortunate few who have served in space to the thousands who make spaceflight a reality. thank you for keeping the dream alive. Your passion for these amazing space ships will always stand as proof of what this country can do when it dares to be bold!

STS-135 crew left this plaque in the cockpit of Atlantis as a tribute to all of the people who have worked on the Space Shuttle Program.



30 YEARS OF FLIGHT

SPACE SHUTTLE PROGRAM **MANAGERS**

Robert Thompson February 1970 - June 1981 Glynn Lunney

June 1981 - June 1985

Richard Kohrs (Interim Mgr)

June 1985 - August 1985 **Arnold Aldrich**

August 1985 - November 1986

Richard Kohrs

November 1986 - June 1989

Leonard Nicholson

June 1989 - March 1993

Brewster Shaw

March 1993 - November 1995

Tommy Holloway

November 1995 - April 1999

Ronald Dittemore

April - 1999 - July 2003

William Parsons

July 2003 - September 2005

Wavne Hale

September 2005 - February 2008

John Shannon

February 2008 - To End of Shuttle Program 2011



Above:(jsc2011e071116): Lead INCO Heidi Brewer hangs final Shuttle plague for STS-135 in White FCR in CCK MCC at JSC.

Below: Atlantis Shuttle Legacy Mural [UPDATED for STS-135] -Hanging in LCC Firing Room at KSC - From Mike Leinbach/Launch Director







A LARGE WELOME HOME & A SUPER WELL DONE!

ABOVE: (JSC2011-E-068785) --- A large crowd welcomes home the crew of STS-135 on July 22, 2011 at Ellington Field near JSC. AT RIGHT: (JSC2011-E-070276) --- JSC Director Michael L. Coats (left), Houston Mayor Annise Parker, U.S. Senator Kay Bailey Hutchison (R.-Texas) and STS-135 Commander Chris Ferguson enjoy the crew return ceremony. Poster reads: "HOUSTON! Always the first word in Space. Thank You!" The Mayor was also presented a flown flag by the STS-135 crew.

NOTES: From STS-135 (ULF7) Post Landing News Conference - July 21, 2011 (From PAO)

Gerst – I really want to thank the Space Shuttle team and Program for today and the entire history of the Program. I can't say enough about meeting the challenges and finishing strong. Today they met all the objectives. I'd also like to thank the nation for supporting this vehicle. It is a true marvel and allowed us to do amazing things. It's going to allow us to move forward and utilize the station and commercial cargo providers come online later this year. We need to go forward and explore.

I recognize that change is very hard, but huge improvement comes from change, so this team can accomplish great things in the future. I wish them the best. They will be successful in the future.

Moses – It's been a heck of a day and heck of a Program. I'm representing a team across the country today and the vehicle performed perfectly. The team here and in Houston are world class. The Marshall team put together a propulsion system that also finished strong. It's been a nice ride.

Cabana – It is great to have Atlantis home to stay after this mission. I can't say enough about the teams here at KSC and how they performed the last few flights. The folks that knew they were going to be out of work performed flawlessly and were dedicated to what they were doing. That is what they do. I am proud to be part of this program. We've achieved the goal of flying out the shuttle safely and we'll celebrate what we've accomplished over the last 30 years. But when that's done, we'll move on to the future.

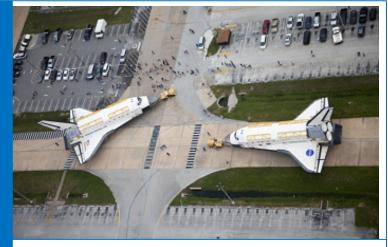
Leinbach – Thanks to the KSC workforce. I've worked here all my career – 27 years. They did their job just like always. The workers here and across the country that dedicated their lives to this are my friends and I wish them well. I want to thank the press as well. You guys have been good friends of the space program as well. It was a good day. Mission complete and we're looking forward to new challenges.



STS135-S-214 (21 July 2011) -- Space Shuttle's "Final Four" stand proudly in front of Atlantis after landing at KSC. From right, are CDR Chris Ferguson, PLT Doug Hurley; Sandy Magnus/MS and Rex Walheim/MS.

U.S. SENATE RESOLUTION 233 HONORING THE MEN AND
WOMEN OF THE NATIONAL
AERONAUTICS AND SPACE
ADMINISTRATION SPACE
SHUTTLE PROGRAM ON
REACHING THE HISTORIC
MILESTONE OF THE 135TH AND
FINAL FLIGHT OF THE SPACE
TRANSPORTATION SYSTEM

Passed U.S. Senate on July 13. 2011



No, they are not rolling out for launch! Discovery & Endeavour are rolling to storage locations at KSC where they will remain until ready for transport to museums, see below.

(Photo from Herirng/PAO)

At Left:

Safely Home...
...Mission Accomplished!

"What a privilege to be on the scene for the last Apollo splashdown AND the last Space Shuttle landing ... and, what a privilege for each of us to have been associated with such talented and dedicated people ..."

Milt Heflin

Apollo Recovery Engineer- Primary Recovery Ship for Apollo 8, 10, 16, 17, Skylab 2,3,4, & ASTP Space Shuttle EPS, Thermal, EGIL, EECOM & Flight Director JSC Associate Director (Technical)

[That's Milt with "hands on hips". Yes, he was there & there. Well Done!] Where will they go?

Announced April 12, 2011:

OV-101 Enterprise Test Vehicle
- To New York City's Intrepid Museum

OV-103 Discovery

- To Smithsonian National Air & Space Museum in Chantilly, Virginia

OV-104 Atlantis

- To Kennedy Space Center, Florida

OV-105 Endeavour

- To California Science Center in Los Angeles

NASA officially closed the books on the Space Shuttle Program on August 31, 2011.



A summary table of weight data for each shuttle element and payloads for each mission is provided in herein. The data for flights STS-1 through STS-57 was extracted from the SODB, Volume II. Effective with STS-51, the SODB data was no longer updated as flown. Therefore, the data has been obtained from the Day-of-Launch (DOL) Trajectory Design Data Package (TDDP), with Mach 3 EOM (End of Mission) and Landing Weights/CG's from the Postflight Prop 30 Reports. The Performance Margin data was extracted from the RI/Boeing Postflight Trajectory Reconstruction Reports.

Starting with STS-75, the Shuttle Program agreed to a 900-lb Ascent Performance Margin (APM) gain for all missions. STS-75 and STS-76 have 900 lbs of inert weight adjustment (-450 lbs inert weight discrepancy adjustment and -450 lbs

performance discrepancy adjustment, which were subtracted from the STS Operator Chargeable Cargo). Effective with STS-77, the -450 lbs was subtracted from the STS Operator Chargeable Cargo and the -450 lbs performance discrepancy is included in the MPS Prop Inventory. Effective with STS-79, the performance adjustment was changed to -200 lbs which is subtracted from the STS Operations Chargeable Cargo. Finally, beginning with STS-97 the TDDP included an item for "RECONSTRUCTED ASCENT PERFORMANCE COLLECTOR" in the "Shuttle Total Weight at SRB Igniton".

The P/L Deployed Weights for MIR flights reflect the weights of hardware transferred to the MIR (does not include consumables transferred to MIR). DOD mission weight data was not available for this document.

(SOURCES: SODB, VOL II Thru STS-57 & DOL TDDP for STS-51 and Beyond)

| | | | (| RBITE | R | | | | | | | CARGO |) | | | ORE | SITER TO | OTALS | | | | PERF | ORBI | ITER | ORBI | TER |
|----------------------|------------|--------|-------|-------|--------|------|--------|----------------|----------|--------|----------------|----------------|--------|------------------|----------|--------|----------|---------|---------|--------------------|---------|------------------|----------------|--------|--------|--------|
| | | | NON- | | | | | | FLIGHT P | AYLOAD | WEIGHTS | 5 | FLIGHT | ACCUM | ULATED | | | | ET | SRB | SHUTTLE | MARG | A ⁻ | Т | ΓA | f |
| | TAIL | W/O | PROP | OMS | RCS | PROP | ORB | | | | | | | | | WT | WT | ACCUM | TOTAL | TOTAL | TOTAL | FINAL | MACH: | 3 EOM | LAND | ING |
| FLIGHT | NO. | | CONS | | | | TOTAL | PRI | DPLY | RETR | ANCIL | CHARGE- | CARGO | PYLD | CARGO | @ | @ | WT @ | @ | LEFT | @ | TDDP | | | | |
| | OV- | CONS. | @ | PROP | | | @ | DPLY/ | AND | | OR * | ABLE | | DPLY/ | | SRB | ORBIT | ORBIT | SRB | & | SRB | & | | | | |
| | | | SRB | | FWD | AFT | SRB | NON- | RETR | ONLY | MID- | PYLD/ | TOTAL | NON- | TOTAL | IGN | INSERT | INSERT | IGN | RIGHT | IGN | RECON | WT | X CG | WT | X CG |
| | | | IGN | | | | IGN | DPLY | | | DECK | STS | | DPLY | | | | | | | | | | | | |
| STS-1 | 102 | 172425 | 5197 | 18408 | 2461 | 5371 | 208437 | 0 | 0 | 0 | | | 10823 | 0 | 10823 | 219260 | 208415 | 208415 | 1664455 | 1295940 | 4459280 | NOT AVAILABLE | 195943 | 1096.7 | 195473 | 1098.1 |
| STS-2 | (1) 102 | 175211 | 5922 | 18011 | 2469 | 5383 | 212161 | 10823 0 | 0 | 0 | | | 18778 | 10823 0 | 29601 | 230939 | 219844 | 428259 | 1647514 | 1298160 1296747 | 4471984 | 2049 | 204356 | 1096 6 | 204263 | 1098.1 |
| 0.02 | (2) | | 00 | | | 0000 | | 18778 | | | | | .00 | 29601 | | | | | | 1296784 | | 275 | | | | |
| STS-3 | 102 (3) | 175374 | 6560 | 17919 | 2446 | 5384 | 212846 | 0 22710 | 0 | 0 | | | 22710 | 0 52311 | 52311 | 235556 | 222985 | 651244 | 1643507 | 1296696 1296915 | 4470555 | 5343 2278 | 207349 | 1095.4 | 207073 | 1096.9 |
| STS-4 | 102 | 175581 | 6588 | 22155 | 2446 | 5344 | 217280 | 0 | 0 | 0 | 1844 | 11644 | 24492 | 0 | 76803 | 241772 | 228442 | 879696 | 1644745 | | 4483983 | 4038 | 209141 | 1092.9 | 208947 | 1094.4 |
| OTC F | (4) | 470700 | FF07 | 40004 | 0440 | F070 | 245022 | 9800 | 0 | 0 | 4070 | 12848 | 22000 | 63955 | 400000 | 247113 | 224242 | 4440000 | 4044005 | 1299253 | 4400070 | 1195 | 000040 | 2004.0 | 202400 | 4000.0 |
| STS-5 | 102 (5) | 176729 | 5507 | 19804 | 2448 | 5379 | 215033 | 14585 5167 | 0 | 0 | 1078 | 20830 12596 | 32080 | 14585 70200 | 108883 | 24/113 | 231213 | 1110869 | 1644995 | 1298256 1298714 | 4489078 | 822 -1017 | 202643 | 2094.8 | 202480 | 1096.3 |
| STS-6 | 099 | 172837 | 5364 | 19242 | 1964 | 5384 | 209957 | 37546 | 0 | 0 | 2263 | 46662 | 46971 | 52131 | 155854 | 256928 | 241325 | 1352224 | 1644495 | 1295364 | 4488967 | 4755 | 190627 | 1099.7 | 190330 | 1101.2 |
| STS-7 | (1) 099 | 172822 | 5415 | 21015 | 2449 | 5372 | 212239 | 6853 14949 | 3192 | 0 | 3942 | 1794 31893 | 37124 | 79316 67080 | 192978 | 249363 | 233619 | 1585843 | 1644631 | 1296180 1295695 | 4484035 | 2463 2940 | 204340 | 1089.8 | 204043 | 1091.2 |
| | (2) | | 0110 | 21010 | | | | 13002 | 0102 | Ŭ | 0012 | 5448 | | 96260 | | | | | | 1294346 | | 2021 | | | | |
| STS-8 | 099 (3) | 172879 | 5363 | 22011 | 2456 | 4962 | 212837 | 7445 13179 | 0 | 0 | 5166 | 25790 4440 | 30076 | 74525 114605 | 223054 | 242913 | 227365 | 1813208 | 1656386 | 1297016 1297508 | 4493822 | 14863 15735 | 204141 | 1090.4 | 203945 | 1091.9 |
| STS-9 | 102 | 179369 | 6184 | 16000 | 2446 | 5384 | 214549 | 0 | 0 | 0 | MIDDECK 0 | 33131 | 33264 | 74525 | 256318 | 247813 | 235793 | 2049001 | 1662238 | 1298367 | 4505505 | 841 | 220288 | 1085.8 | 220027 | 1087.1 |
| | (6) | | | | | | | 32261 | | | CRYO TK 870 | 1708 | | 147736 | | | | | | 1297983 | | -411 | | | | |
| STS 41-B (STS-11) | 099 (4) | 173041 | 6210 | 24704 | 2446 | 4970 | 216537 | 15073 10198 | 0 | 0 | 2981 | 28252 5598 | 33868 | 89598 160915 | 290186 | 250405 | 234108 | 2283109 | 1662570 | 1295569 1296187 | 4500237 | 12062 6961 | 201529 | 1087.9 | 201239 | 1089.3 |
| | | 173207 | 5285 | 25096 | 2449 | 5012 | 216215 | 21396 | 0 | 0 | 41 | 33831 | 38266 | 110994 | 328452 | 254481 | 245167 | 2528276 | 1661790 | 1295828 | 4508234 | 995 | 197170 | 1100.0 | 196976 | 1101.6 |
| 070 44 55 | (5) | 470044 | == 40 | 20004 | 0.4.40 | 4070 | 040405 | 12394 | | | 4474 | 4446 | 47540 | 173350 | 075000 | 000004 | 0.40000 | 0775470 | 4000000 | 1296378 | 4540500 | -3322 | 000017 | 1000 = | 004075 | 1001 7 |
| STS-41-DR | 103 (1) | 173911 | 5/48 | 23864 | 2446 | 4970 | 216105 | 30086 10122 | 0 | 0 | 1174 | 41382 6521 | 47516 | 141080 184646 | 375968 | 263621 | 246903 | 2775179 | 1662823 | 1296101 1298244 | 4518538 | -1611 -1564 | 202317 | 1090.7 | 201675 | 1091.7 |
| STS 41-G | 099 | 175411 | 6236 | 25088 | 2465 | 4970 | 219326 | 4949 | 0 | 0 | 657 | 17592 | 23465 | 146029 | 399433 | 242791 | 226344 | 3001523 | 1662451 | 1296571 | 4495592 | 2194 | 202829 | 1083.7 | 202266 | 1084.8 |
| STS 51-A | (6) 103 | 174036 | 6211 | 25107 | 2446 | 4070 | 218016 | 11986 22764 | 0 | 2381 | 187 | 5772 38003 | 45306 | 197289 168793 | 444739 | 263352 | 247014 | 3248537 | 1662369 | 1296300 1299428 | 4500111 | 3375 281 | 207983 | 1081.4 | 207506 | 1082.6 |
| 31331-A | (2) | 174030 | 0311 | 23107 | 2440 | 4970 | 210010 | 15052 | U | 2301 | 107 | 7717 | 45500 | 212528 | 444739 | 203332 | 247014 | 3240331 | 1002309 | 1299700 | 4522111 | 1003 | 201903 | 1001.4 | 207500 | 1002.0 |
| STS 51-C | 103 | | | | | | | | | | | DOD | WEIGH | T DATA N | IOT AVAI | LABLE | | | | | | | | 1091.8 | 197700 | 1096.8 |
| STS 51-D | (3) 103 | 174756 | 6272 | 21464 | 2446 | 4970 | 214855 | 22576 | 0 | 0 | 1079 | 28747 | 35794 | 191369 | 480513 | 250679 | 239298 | 3487835 | 1661830 | 1297460 | 4504439 | -1457 1243 | 198167 | 1092.7 | 198014 | 1094.3 |
| | (4) | | | | | | | 5092 | | | | 7265 | | 218699 | | | | | | 1296665 | | 1957 | | | | |
| STS 51-B | 099 (7) | 174968 | 5397 | 22900 | 2446 | 4970 | 215847 | 105 30341 | 0 | 0 | 302 | 30748 1727 | 31377 | 191474 249342 | 511910 | 247254 | 230944 | 3718779 | 1661509 | 1296246 1296969 | 4501978 | 2536 3609 | 213795 | 1084.1 | 213499 | 1085.4 |
| STS 51-G | 103 | 174862 | 6272 | 18600 | 2446 | 4970 | 212316 | 22832 | 2217 | 0 | 560 | 38258 | 44477 | 214306 | 556387 | 256823 | 243779 | 3962558 | 1661726 | 1297968 | 4518845 | 160 | 204321 | 1082.1 | 204169 | 1083.7 |
| OTO E4 F | (5) | 175060 | F207 | 25064 | 2440 | 4070 | 240202 | 14866 | 0 | 0 | 1755 | 6299 | 24400 | 264768 | E00707 | 252722 | 227024 | 4200480 | 1661220 | 1298704 | 4514040 | -1664 NOT | 246904 | 1070.0 | 246725 | 1001.0 |
| STS-51-F | 099 (8) | 175260 | 5397 | 25064 | Z446 | 4970 | 218303 | 0 31257 | 0 | 0 | 1755 | 33012 1492 | 34400 | 214306 297780 | 590787 | 252733 | 237931 | 4200489 | 1661338 | 1300211 1300031 | 4514313 | NOT AVAILABLE | 216894 | 1079.8 | 216735 | 1081.3 |
| | (-) | | | | | | | | | | | | | | | | | | | | | | | | | |

(SOURCES: SODB, VOL II Thru STS-57 & DOL TDDP for STS-51 and Beyond)

| | | | (| ORBITE | R | | | | | | (| CARGO | 1 | | | ORE | SITER TO | TALS | | | | PERF | ORBI [*] | ΓER | ORBI | TER |
|----------|------------|--------|------------|--------|------|------|------------|--------------------|----------|---------|---------|---------------|----------|------------------|----------|-----------|----------|---------|---------|--------------------|----------|------------------|-------------------|-----------|-----------|-----------|
| | | | NON- | | | | | | FLIGHT F | PAYLOAD | WEIGHTS | i | FLIGHT | ACCUM | JLATED | | | | ET | SRB | SHUTTLE | MARG | АТ | - | Α٦ | t |
| | TAIL | W/O | PROP | OMS | RCS | PROP | ORB | | | | | | | | | WT | WT | ACCUM | TOTAL | TOTAL | TOTAL | FINAL | MACH 3 | EOM | LAND | ING |
| FLIGHT | NO. | | CONS | | | | TOTAL | PRI | DPLY | RETR | MID- | CHARGE- | CARGO | PYLD | CARGO | @ | @ | WT @ | @ | LEFT | @ | TDDP | | | | |
| | OV- | CONS. | @ | PROP | | | @ | DPLY/ | AND | | | ABLE | | DPLY/ | | SRB | ORBIT | ORBIT | SRB | & | SRB | & | | | | |
| | | | SRB IGN | | FWD | AFT | SRB IGN | NON- DPLY | RETR | ONLY | DECK | PYLD/ STS | TOTAL | NON- DPLY | TOTAL | IGN | INSERT | INSERT | IGN | RIGHT | IGN | RECON | WT | X CG | WT | X CG |
| STS 51-I | | 174785 | 6272 | 24646 | 2446 | 4970 | 218285 | 30289 | 0 | 0 | 374 | 38884 | 43988 | 244595 | 634775 | 262303 | 249479 | 4449968 | 1661662 | 1297697 | 4520198 | 176 | 196856 | 1092.4 | 196674 | 1094.2 |
| OTC 54 1 | (6) | | | | | | | 8221 | | | | 5223 | | 306375 | | | | | | 1298536 | | -1145 | | | 400705 | 4404.0 |
| STS 51-J | (1) | | | | | | | | | | | - DOD V | VEIGHT | DATA NO | OT AVAIL | ABLE | | | | | | | | | 190765 | 1101.2 |
| STS 61-A | 099 | 175531 | 5397 | 18300 | 2446 | 4970 | 211810 | | 0 | 0 | 2164 | 30519 | 31911 | 244745 | 666686 | 243751 | 227797 | 4677765 | 1665455 | | 4505113 | 6222 | 214325 | 1083.8 | 214171 | 1085.2 |
| OTO 04 D | (9) | 475045 | 0070 | 22222 | 1000 | 4070 | 04000 | 27330 | - | | 400= | 1587 | 47700 | 335869 | 744405 | 004444 | 05000 | 1000001 | 4004470 | 1297886 | 4545500 | 6219 | 005000 | 10011 | 005700 | 1005.0 |
| STS 61-B | | 1/5615 | 6272 | 20000 | 1882 | 4970 | 213905 | 27465 13986 | 0 | 0 | 1337 | 42788 5236 | 47509 | 272210 | 714195 | 261444 | 250836 | 4928601 | 1661470 | 1296606 1296018 | 4515538 | 874 2332 | 205880 | 1084.4 | 205732 | 1085.9 |
| STS 61-C | (2) | 185529 | 5602 | 22700 | 2006 | 4970 | 223153 | | 0 | 0 | 437 | 28625 | 32733 | 351192 284561 | 746928 | 255916 | 238764 | 5167365 | 1665325 | | 4512534 | | 210325 | 1083.6 | 210161 | 1085 1 |
| 01001-0 | (7) | 100023 | 3032 | 22100 | 2030 | 4370 | 220100 | 15837 | U | O | 707 | 5547 | 32733 | 367466 | 7-0320 | 200010 | 230704 | 3107303 | 1000020 | 1295702 | 7012007 | 11127 | 210020 | 1005.0 | 210101 | 1003.1 |
| STS 51-L | 099 | 175760 | 5397 | 21500 | 2446 | 4970 | 215239 | | 0 | 0 | 830 | 48633 | 52655 | 0000 | | 267929 | | | 1665170 | | 4528770 | NOT AVAILABLE | 199585 | 1089.7 | | 1091.3 |
| | (10) | | | | | | | 10167 PROJECTED | | | | 4171 | | | | | | | | 1297848 | | AVAILABLE | PROJECTED | PROJECTED | PROJECTED | PROJECTED |
| STS-26 | 103 | 176680 | 5409 | 14000 | 1914 | 4970 | 208139 | | 0 | 0 | 1159 | 44601 | 46448 | 322075 | 793376 | 254617 | 243158 | 5410523 | 1664857 | 1301509 | 4522407 | 1546 | 194347 | 1096.6 | 194184 | 1098.3 |
| 070.07 | (7) | | | | | | | 5928 | | | | 3073 | | 374553 | | | | | | 1301424 | | 624 | | | 100050 | 1005.1 |
| STS-27 | 104 (3) | | | | | | | | | • | | - DOD V | VEIGHT | DATA NO | OT AVAIL | 4BLE | | | | | | 2905 -286 | | | 190956 | 1095.1 |
| STS-29 | 103 (8) | 177365 | 5409 | 13984 | 1914 | 4973 | 208811 | 37640 6727 | 0 | 0 | 949 | 45316 3303 | 47394 | 359715 382229 | 840770 | 256235 | 244949 | 5655472 | 1664872 | 1300254 1300916 | 4522277 | 3772 2995 | 194940 | 1093.7 | 194790 | 1095.3 |
| STS-30 | | 177163 | 5415 | 18916 | 1906 | 4977 | 213543 | | 0 | 0 | 165 | 45823 | 17783 | 399833 | 888553 | 261356 | 245051 | 5900523 | 1664743 | 1300310 | 4527426 | 4709 | 192558 | 1097 4 | 192460 | 1099 1 |
| 0.000 | (4) | 111100 | 0110 | 10010 | 1000 | 1011 | 210010 | 5540 | Ŭ | ŭ | .00 | 3140 | 11100 | 387934 | 000000 | 201000 | 2 10001 | 0000020 | 1001110 | 1300880 | 1027 120 | 2650 | 102000 | 100111 | 102 100 | 1000.1 |
| STS-28 | 102 | | | - | | • | | | | | | | VEICHT | DATA NO | T 41/411 | A DI E | | | | | | 409 | | | 200214 | 1089.4 |
| | (8) | | | | | | | | | | | | | | | | | | | | | 158 | | | | |
| STS-34 | 104 (5) | 177407 | 5479 | 14007 | 1926 | 4987 | 208972 | 38323 6696 | 0 | 0 | 886 | 45905 3871 | 48613 | 438156 395516 | 937166 | 257615 | 246268 | 6146791 | 1664981 | 1300812 1300165 | 4523573 | 2103 -132 | 196112 | 1093.1 | 195954 | 1094.7 |
| STS-33 | 103 | | | | | | | | | | | DOD / | VEICHT | DATA NO | T 41/411 | A DI E | | | | | | 1157 | | | 194282 | 1094.8 |
| | (9) | | | | | | | | | | | | | DATANG | | | | | | | | 653 | | | | |
| STS-32 | 102 (9) | 184982 | 7165 | 25187 | 2224 | 4951 | 229575 | 15316 1962 | 0 | 21398 | 1039 | 18317 8141 | 26458 | 453472 398517 | 963624 | 256063 | 244557 | 6391348 | 1664843 | 1299175 1299406 | 4510498 | 1956 992 | 228523 | 1078.2 | 228335 | 1079.6 |
| STS-36 | 104 | | | | | - | | .002 | | | | | A/EIOLIT | | T 41/411 | 4 D.L. E. | | | | | | 881 | | | 187200 | 1096.4 |
| | (6) | | | | | | | | | | | י טטט י | /VEIGHT | DATA NO | JI AVAIL | | | | | | | 930 | | | | |
| STS-31 | | 177516 | 5556 | 25045 | 2219 | 4966 | 220468 | | 0 | 0 | 652 | 25517 | 28643 | 476567 | 992267 | 249141 | 231665 | 6623013 | 1665069 | | 4514665 | 2861 | 189309 | 1087.9 | 189118 | 1089.7 |
| CTC 44 | (10) | 477500 | E 400 | 4.4500 | 4004 | 4004 | 200500 | 960 | 0 | 0 | 007 | 3126 | 40000 | 400129 | 4040000 | 250504 | 040400 | 0074444 | 4004077 | 1300214 | 4507400 | 1352 | 400000 | 4000.4 | 400000 | 4004.0 |
| STS-41 | 103 (11) | 177599 | 5406 | 14509 | 1861 | 4961 | 209502 | 38604 6732 | 0 | 0 | 837 | 46173 3796 | 49969 | 515171 407698 | 1042236 | 259501 | 248128 | 6871141 | 1664877 | 1301372 1301388 | 452/138 | 1270 -152 | 196982 | 1089.4 | 196869 | 1091.2 |
| STS-38 | 104 | | | | | | | 0132 | | | | | | | | | | | | 1301300 | | 863 | | | 191091 | 1098 6 |
| 0.00 | (7) | | | | | | | | | | | DOD \ | WEIGHT | DATA NO | T AVAIL | ABLE | | | | | | 474 | | | .0.001 | . 555.5 |
| | , | | | | | | | | | | | | | | | | | | | | | | | | | |

(SOURCES: SODB, VOL II Thru STS-57 & DOL TDDP for STS-51 and Beyond)

| | | | (| ORBITE | R | | | | | | | CARGO |) | | | ORE | SITER TO | TALS | | | | PERF | ORBI | TER | ORBI | TER |
|--------|-------------|--------|------|--------|-------|------|--------|---------------|----------|---------|---------|---------------|--------|------------------|----------|----------|----------|----------|----------|--------------------|-----------|--------------|----------------|--------|--------|--------|
| | | | NON- | | | | | | FLIGHT F | PAYLOAD | WEIGHTS | S | FLIGHT | ACCUM | ULATED | | | | ET | SRB | SHUTTLE | MARG | A ⁻ | Т | ΓA | f |
| | TAIL | W/O | PROP | OMS | RCS | PROP | ORB | | | | | | | | | WT | WT | ACCUM | TOTAL | TOTAL | TOTAL | FINAL | MACH | 3 EOM | LAND | ING |
| FLIGHT | NO. | | CONS | | | | TOTAL | PRI | DPLY | RETR | MID- | CHARGE- | CARGO | PYLD | CARGO | @ | @ | WT @ | @ | LEFT | @ | TDDP | | | | |
| | OV- | CONS. | @ | PROP | | | @ | DPLY/ | AND | | | ABLE | | DPLY/ | | SRB | ORBIT | ORBIT | SRB | & | SRB | & | | | | |
| | | | SRB | | FWD | AFT | SRB | NON- | RETR | ONLY | DECK | PYLD/ | TOTAL | NON- | TOTAL | IGN | INSERT | INSERT | IGN | RIGHT | IGN | RECON | WT | X CG | WT | X CG |
| | | | IGN | | | | IGN | DPLY | | | | STS | | DPLY | | | | | | | | | | | | |
| STS-35 | 102 | 184580 | 7156 | 19339 | 2232 | 4971 | 223444 | 0 | 0 | 0 | 1792 | 27760 | 33037 | 515171 | 1075273 | 256511 | 243474 | 7114615 | 1664775 | 1300088 | 4521514 | 4131 | 225531 | 1079.1 | 225329 | 1080.5 |
| | (10) | | | | | | | 25968 | | | | 5277 | | 435458 | | | | | | 1300140 | | 3812 | | | | |
| STS-37 | 104 | 177763 | 5379 | 20053 | 1835 | 4971 | 215167 | 34442 | 0 | 0 | 743 | 36800 | 40561 | 549613 | 1115834 | 255758 | 240809 | 7355424 | 1664803 | 1300130 | 4519945 | 1116 | 190266 | 1087.4 | 190098 | 1089.2 |
| STS-39 | (8) 103 | 179611 | 6257 | 22553 | 2454 | 4074 | 221012 | 1615 827 | 4046 | 0 | 494 | 3761 21413 | 26294 | 437816 550440 | 1142128 | 247336 | 236623 | 7592047 | 1664494 | 1299254 1299733 | 4513048 | 525 1054 | 211673 | 1000.2 | 211512 | 1002.0 |
| 313-39 | (12) | 179011 | 0237 | 22000 | 2431 | 4974 | 221012 | 16046 | 3955 | U | 494 | 4881 | 20294 | 454356 | 1142120 | 247330 | 230023 | 7392047 | 1004494 | 1301485 | 4313046 | 2768 | 211073 | 1000.3 | 211312 | 1002.0 |
| STS-40 | 102 | 185755 | 7111 | 13265 | 1919 | 4968 | 218184 | 0 | 0 | 0 | 1877 | 28114 | 33707 | 550440 | 1175835 | 251921 | 241175 | 7833222 | 1664845 | 1301303 | 4519792 | 3137 | 226737 | 1079.6 | 226535 | 1080.9 |
| | (11) | | | | | | | 26237 | | | | 5593 | | 482470 | | | | | | 1301723 | | 4212 | | | | |
| STS-43 | 104 | 177623 | 6245 | 14126 | 1860 | 4972 | 209992 | 37575 | 0 | 0 | 991 | 46712 | 49325 | 588015 | 1225160 | 259347 | 247964 | 8081186 | 1664898 | 1299653 | 4523118 | 2656 | 196353 | 1087.4 | 196088 | 1089.7 |
| | (9) | | | | | | | 8146 | | | | 2613 | | 491607 | | | | | | 1299220 | | 2593 | | | | |
| STS-48 | 103 | 178149 | 5466 | 22643 | 2061 | 4970 | 218455 | 14388 | 0 | 0 | 690 | 17144 | 21569 | 602403 | 1246729 | 240054 | 224141 | 8305327 | 1665078 | 1298959 | 4502671 | 510 | 192925 | 1096.0 | 192780 | 1097.8 |
| STS-44 | (13) | 177016 | 6045 | 16200 | 1002 | 4076 | 242506 | 2066 37588 | 0 | 0 | 1010 | 4425 44637 | 47235 | 494363 | 1202064 | 250054 | 247007 | 8552414 | 1664283 | 1298580 | 4522576 | -562 565 | 105047 | 1000.0 | 104010 | 1002 5 |
| 515-44 | 104 (10) | 177916 | 6245 | 16390 | 1893 | 4976 | 212586 | 5809 | U | U | 1240 | 2598 | 47235 | 639991 501415 | 1293964 | 259851 | 247087 | 8552414 | 1004283 | 1298356 1300086 | 4522576 | 1025 | 195047 | 1090.8 | 194818 | 1092.5 |
| STS-42 | 103 | 178203 | 6341 | 14469 | 1908 | 4974 | 211062 | 0 | 0 | 0 | 2210 | 28663 | 32364 | 639991 | 1326328 | 243456 | 231497 | 8783911 | 1664527 | 1300167 | 4507474 | 2511 | 218159 | 1080.6 | 218089 | 1082.2 |
| 0.0.2 | (14) | 170200 | 0011 | | 1000 | | 211002 | 26453 | | Ŭ | | 3701 | 02001 | 530075 | 1020020 | 2 10 100 | 201101 | 0100011 | 100 1021 | 1299324 | 1007 17 1 | 2716 | 210100 | 1000.0 | 210000 | 1002.2 |
| STS-45 | 104 | 177732 | 6337 | 16894 | 2180 | 4970 | 213279 | 0 | 0 | 0 | 2145 | 17683 | 20341 | 639991 | 1346669 | 233650 | 222086 | 9005997 | 1664861 | 1298457 | 4496035 | 11017 | 205672 | 1085.4 | 205588 | 1087.2 |
| | (11) | | | | | | | 15538 | | | | 2658 | | 547758 | | | | | | 1298957 | | 10427 | | | | |
| STS-49 | 105 | 180161 | 6197 | 19916 | 2448 | 4971 | 218859 | 23346 | 0 | 0 | 697 | 32809 | 37444 | 663337 | 1384113 | 256333 | 246008 | 9252005 | 1664838 | 1299195 | 4519154 | 3351 | 201400 | 1084.4 | 201235 | 1086.2 |
| 070.50 | (1) | 400000 | 0700 | 40000 | 4000 | 4007 | 005040 | 8766 | 0 | 0 | 0470 | 4635 | 00447 | 557221 | 4.440500 | 057005 | 0.45000 | 0.407007 | 1001015 | 1298788 | 4500400 | 3206 | 005005 | 4077.7 | 005045 | 4070.4 |
| STS-50 | 102 (12) | 186622 | 9760 | 16830 | 1903 | 4967 | 225218 | 0 22126 | 0 | 0 | 2179 | 24305 8142 | 32447 | 663337 581526 | 1416560 | 257695 | 245902 | 9497907 | 1664945 | 1298413 1299050 | 4520103 | 2940 3276 | 225865 | 1077.7 | 225615 | 1079.1 |
| STS-46 | 104 | 178089 | 6380 | 24887 | 2451 | 4968 | 221941 | 9901 | 1486 | 0 | 1104 | 28585 | 34060 | 673238 | 1450620 | 256031 | 241797 | 9739704 | 1664720 | 1299030 | 4516789 | 2825 | 209851 | 1078 2 | 209532 | 1079.6 |
| 010 40 | (12) | 170003 | 0000 | 24007 | 2-101 | 1300 | 221541 | 16094 | 1396 | | 1104 | 5475 | 04000 | 598724 | 1400020 | 200001 | 241757 | 3703704 | 1004720 | 1298292 | 4010703 | 1942 | 200001 | 1070.2 | 200002 | 1075.0 |
| STS-47 | 105 | 179161 | 6286 | 14559 | 1917 | 4979 | 212058 | 0 | 0 | 0 | 1845 | 28092 | 32480 | 673238 | 1483100 | 244568 | 232661 | 9972365 | 1664720 | 1298225 | 4506804 | 1348 | 220325 | 1083.7 | 220195 | 1085.3 |
| | (2) | | | | | | | 26247 | | | | 4388 | | 626816 | | | | | | 1299291 | | 2887 | | | | |
| STS-52 | 102 | 186650 | 7127 | 17398 | 2163 | 4974 | 223478 | 5577 | 0 | 0 | 2080 | 20132 | 26862 | 678815 | 1509962 | 250370 | 239178 | 10211543 | 1664613 | 1299187 | 4514565 | 10788 | 216043 | 1082.6 | 215935 | 1084.3 |
| 070.50 | (13) | 470005 | 5054 | 40000 | 4040 | 1001 | 045554 | 12475 | | | 1000 | 6730 | 00040 | 641371 | 4500050 | 0.40007 | 000704 | 40440074 | 1001005 | 1300395 | 4500505 | 9801 | 101000 | 4000 = | 100051 | 10010 |
| STS-53 | 103 | 179035 | 5874 | 18600 | 1912 | 4964 | 215551 | 20789 | 0 | 0 | 1030 | 26118 | 28316 | 699604 | 1538278 | 243897 | 230731 | 10442274 | 1664985 | 1299174 | 4506587 | 1368 | 194028 | 1089.5 | 193851 | 1091.3 |
| STS-54 | (15) 105 | 178558 | 5895 | 14278 | 1925 | 4980 | 210802 | 4299 37497 | 0 | 0 | 1052 | 2198 46540 | 49039 | 646700 737101 | 1587317 | 259871 | 248338 | 10690612 | 1664458 | 1298531 1299819 | 4523299 | 2844 2659 | 197481 | 1091.6 | 197353 | 1093.4 |
| 313-34 | (3) | 170000 | 3093 | 14270 | 1923 | 4900 | 210002 | 7991 | U | U | 1032 | 2499 | 49039 | 655743 | 1307317 | 259071 | 240330 | 10090012 | 1004436 | 1299151 | 4020299 | 3421 | 197401 | 1091.0 | 197333 | 1093.4 |
| STS-56 | 103 | 179811 | 6287 | 17526 | 2456 | 4967 | 216223 | 0 | 2840 | 0 | 1031 | 16439 | 21003 | 737101 | 1608317 | 237253 | 225597 | 10916209 | 1664388 | 1299765 | 4501920 | 9521 | 208052 | 1084.6 | 207946 | 1086.3 |
| | (16) | | - | | | | | 12568 | 2798 | | _ | 4561 | | 669342 | | | | | | 1300514 | | 10714 | | | | |
| STS-55 | 102 | 186929 | 7345 | 15687 | 1928 | 4967 | 222022 | 0 | 0 | 0 | 2282 | 26881 | 33416 | 737101 | 1641733 | 255468 | 244156 | 11160365 | 1664456 | 1298515 | 4519000 | 6248 | 227484 | 1078.4 | 227209 | 1079.7 |
| | (14) | | | | | | | 24599 | _ | | | 6535 | | 696223 | | | | | | 1300561 | | 7559 | | | | |
| STS-57 | 105 | 179410 | 6412 | 25147 | 2450 | 4969 | 223554 | 132 | 0 | 9424 | 1254 | 19630 | 29119 | 737233 | 1670852 | 252703 | 239319 | 11399684 | 1664332 | 1300548 | 4518566 | 2030 | 224752 | 1081.1 | 224468 | 1082.5 |
| | (4) | | | | | | | 18244 | | | | 9489 | | 715721 | | | | | | 1300983 | | 2162 | | | | |

(SOURCES: SODB, VOL II Thru STS-57 & DOL TDDP for STS-51 and Beyond)

PERF **ORBITER** ORBITER ORBITER CARGO ORBITER TOTALS NON-FLIGHT PAYLOAD WEIGHTS FLIGHT ACCUMULATED ET SRB SHUTTLE MARG ΑT AT TAIL W/O **PROP** OMS RCS PROP ORB WT WT **ACCUM** TOTAL TOTAL TOTAL FINAL MACH 3 FOM LANDING RETR **CARGO** PRI DPLY MID-CHARGE-PYLD **CARGO** FLIGHT TOTAL @ @ WT @ @ LEFT @ TDDP CONS. **PROP** DPI Y/ AND ABLE DPLY/ SRB **ORBIT** ORBIT SRB & SRB @ @ & AFT TOTAL RECON **SRB** FWD SRB NON-RETR ONLY DECK PYLD/ NON-**TOTAL INSERT INSERT** IGN **RIGHT** WT X CG WT X CG IGN IGN DPLY DPLY IGN STS STS-51 179422 6003 16743 2451 4978 214763 26889 7321 1122 42637 46685 1717537 261487 250023 11649708 1664649 1298328 4523125 206932 1086.5 103 764122 1358 207043 1084.8 0 (17)7305 4048 724148 1298670 1273 1373 **STS-58** 102 187669 | 9789 | 14520 | 1945 | 4975 | 224062 0 0 0 23127 32011 764122 1749548 256103 | 244860 | 11894568 1664337 1298196 4517138 767 229481 1078.8 229369 1080.4 21754 8884 747275 1298502 1114 **STS-61** 181308 7000 24989 2451 4971 225885 665 24363 250279 236670 12131238 1664521 1298559 4511794 1078.9 212836 105 2308 0 2148 17401 766430 1773911 927 212947 1080.6 14428 6962 762368 1298436 554 STS-60 103 179635 | 6510 | 18045 | 2450 | 4972 | 216778 171 1110 22296 28957 766601 1802868 245765 233290 12364528 1664515 1298776 4508839 216663 | 1079.6 | 216595 0 110 1081.3 (18)21015 6661 784493 1298783 306 STS-62 102 187779 | 9733 | 16797 | 2091 4968 226533 0 0 0 1280 19792 30016 766601 1832884 256579 | 245457 | 12609985 1664370 1299668 4519801 871 228360 1082.6 228250 1084.1 18512 (16)10224 804285 1299184 1795 33758 STS-59 180488 | 7220 | 13287 | 1924 4976 213061 0 0 1445 27447 766601 1866642 246849 | 237048 | 12847033 1664202 1300061 4511411 2856 221981 1079.6 221865 1081.2 105 0 26002 831732 1300299 (6) 6311 1731 STS-65 102 188398 9567 16385 | 1898 | 4975 | 226389 0 0 1761 24282 32880 766601 1899522 | 259296 | 247778 | 13094811 | 1664460 1299585 4523441 229368 | 1078.6 | 229261 1080.1 0 2169 (17)22521 8598 856014 1300097 3531 STS-64 103 180122 | 6286 | 16789 | 2451 | 4969 | 215783 0 2842 0 1363 20417 25621 1925143 241439 230743 13325554 1664420 1298946 4503921 6409 212294 | 1082.3 | 212180 1083.9 766601 1299121 (19)16212 2800 5204 873589 9639 34252 180520 | 7225 | 13321 | 1913 | 4976 | 213121 27640 766601 1959395 247404 | 237742 | 13563296 1664393 1299294 4510613 221784 | 1078.7 | 221673 STS-68 105 0 0 0 1643 1721 1080.4 25997 6612 901229 1299523 2071 STS-66 104 180096 7163 20801 2448 4974 220648 0 7154 0 1080 18135 23560 766601 1982955 | 244238 | 232278 | 13795574 1664386 1299860 4508715 3284 211562 1084.4 211411 1086.1 (13)9901 7011 5426 912210 1300231 3158 4980 222692 STS-63 103 179828 | 6285 | 23979 | 2454 23 2651 0 1128 19051 24903 766624 2007858 247630 235671 14031245 1664161 1299714 4511630 1830 212775 | 1079.5 | 212693 1081.2 (20)15249 2617 5852 928587 1300130 3476 STS-67 180588 | 10610 | 24154 | 2447 | 4972 | 227937 0 0 1764 20067 28528 766624 2036386 256495 | 243809 | 14275054 | 1664446 1299857 | 4520187 217646 | 1083.5 | 217437 105 0 4099 1085.0 18303 8461 948654 1299389 6754 STS-71 104 180545 | 7390 | 21956 | 2452 | 4972 | 222481 0 0 476 690 17941 26577 766624 2062963 249089 | 238682 | 14513736 1664561 1299083 4511586 1040 216527 1079.7 216352 1081.3 1298854 (14)17251 8636 966595 1398 STS-70 103 179039 | 5537 | 15110 | 1921 | 4982 | 211755 | 37774 1086 44445 46799 804398 2109762 258584 247141 14760877 1664631 1299218 4521772 3789 194267 1097.2 194190 0 0 1099.1 5585 2354 973266 1299339 5299 (21) STS-69 105 180072 7149 24993 2452 4973 224805 25346 31549 804398 2141311 256385 243328 15004205 1664169 1299385 4519114 1080.7 219298 1082.3 0 7306 0 1301 5409 219395 16739 7258 6203 991306 1299176 7966 STS-73 102 188174 | 10734 | 12653 | 1883 | 4972 | 223592 0 0 2008 25310 33705 804398 2175016 257321 246718 15250923 1664190 1299554 4521581 1906 230603 1080.7 230479 1082.3 23302 1016616 1300510 (18)8395 4902 STS-74 104 179624 7175 25155 2453 4976 224549 10015 0 690 914 14064 23687 814413 2198703 248266 | 237141 | 15488064 1664354 1299872 4512395 1823 202767 1078.7 202718 1080.6 3135 9623 1020665 1299903 3689 STS-72 181188 | 7149 | 25038 | 2452 | 4970 | 225963 0 2643 10459 898 21018 814413 | 2219721 | 247011 238498 15726562 1664138 1302278 4514647 218496 1081.7 218345 1083.3 105 14087 11447 1032109 1301220 13346 (10) 10546 6931 STS-75 102 188372 | 9386 | 19109 | 2452 | 4970 | 229455 1494 0 1369 23353 32006 815907 2251727 261491 | 250226 | 15976788 | 1663825 1300542 4526493 1594 226443 | 1079.4 | 226287 1080.9 (19)20490 8653 1053968 1300635 638

^{*} NOTE: DEPLOYED, NON-DEPLOYED, AND DEPLOYED/RETRIEVED REFLECT ACTUALS, E.G., WSF WAS NOT DEPLOYED AND RETRIEVED ON STS-60; TSS WAS LEFT IN SPACE ON STS-75.

(SOURCES: SODB, VOL II Thru STS-57 & DOL TDDP for STS-51 and Beyond)

PERF **ORBITER** ORBITER ORBITER CARGO ORBITER TOTALS FT NON-FLIGHT PAYLOAD WEIGHTS FLIGHT ACCUMULATED SRB SHUTTLE MARG AT ΑT W/O **PROP** RCS PROP ORB WT WT ACCUM **TOTAL** TOTAL TOTAL FINAL MACH 3 FOM LANDING OMS CARGO TOTAL PRI RETR MID-CHARGE PYLD CARGO FLIGHT DPLY @ @ WT@ @ LEFT @ **TDDP** DPLY/ CONS. **PROP** DPLY/ SRB ORBIT ORBIT SRB & SRB @ @ AND & AFT **RECON SRB** FWD SRB NON-RETR ONLY DECK PYLD/ TOTAL **TOTAL INSERT INSERT** IGN **RIGHT** WT X CG WT X CG NON-IGN IGN DPLY DPLY **IGN** STS STS-76 180112 7216 21664 2451 4976 221585 818721 2276332 246222 238531 1664159 1299899 4509631 211913 1082.8 104 2814 0 736 760 14152 24605 16215319 3140 211805 1084.5 (16)10578 10453 1065306 1299353 3563 STS-77 105 180204 7235 19483 | 2453 | 4976 | 219518 1104 1837 0 866 27393 35205 819825 2311537 | 254753 243818 16459137 1664470 1300764 4519162 5381 222399 | 1080.5 | 222276 | 1082.0 (11)23586 1820 7812 1089758 1299175 8528 STS-78 188422 | 10876 | 13227 | 1940 | 4979 | 224611 2343391 256495 1664859 228986 102 0 0 2066 23666 31854 819825 245723 | 16704860 1297868 | 4517477 3683 229134 | 1081.9 1083.4 0 (20)21598 1113422 1298255 4245 8188 STS-79 104 180241 7286 21473 2450 4971 221598 3170 2126 718 19039 27812 822995 2371203 | 249440 241776 16946636 1664353 1297828 4510469 215990 | 1081.3 | 215904 1083.0 0 462 (17)15151 8773 1129291 1298848 716 STS-80 102 187805 | 9760 | 20528 | 2451 | 4975 | 230676 0 12524 0 1109 21208 31111 822995 2402314 261817 248721 17195357 1663927 1299137 | 4524735 487 227815 | 1079.1 | 227670 1080.6 (21)7575 12427 9903 1137975 1299854 1103 1663879 STS-81 104 180533 7284 21574 | 2452 | 4978 | 221988 4019 2842 810 19321 28149 827014 2430463 250167 242178 17437535 1298753 4511011 1286 215403 1081.4 215337 1083.1 0 (18)1153277 1298212 2118 14492 8828 STS-82 103 182897 | 6572 | 25010 | 2448 | 4971 | 227065 6941 6638 512 17374 24891 833955 2455354 251986 239583 | 17677118 | 1663879 1299604 4513855 3503 213949 | 1077.8 | 213869 | 1079.6 0 9921 7517 1163710 1298386 4235 STS-83 102 187924 | 10876 | 15000 | 1912 | 4970 | 225849 0 2020 25556 34373 833955 2489727 259963 248526 17925644 1663889 1299392 4522925 4820 235510 1078.5 235421 1080.0 0 23536 1189266 1299392 3741 (22)8817 179665 7163 21674 2455 4973 221097 3902 2576 1136 19643 28497 2518224 249624 1663879 1298206 | 4509832 STS-84 104 0 837857 241827 | 18167471 938 216169 | 1081.0 | 216021 1082.6 14605 8854 1205007 1298123 868 (19) **STS-94** 102 187901 | 10876 | 15058 | 1918 | 4968 | 225890 0 0 2032 25568 34359 837857 2552583 260279 248956 18416427 1664630 1297078 4519333 2845 230818 | 1078.4 | 230773 1080.1 0 (23)23536 8791 1230575 1297346 4193 STS-85 103 181354 7072 17089 2450 4978 218082 7726 0 1590 24982 31959 837857 2584542 250101 238142 18654569 1664460 1298435 4512125 1446 221335 1082.0 221264 1083.6 (23)15666 7587 6977 1247831 1299129 3065 STS-86 180477 | 7283 | 21682 | 2451 | 4975 | 222037 6058 602 21039 29728 843915 2614270 | 251795 | 241773 | 18896342 | 1664491 1297660 4512024 1756 215387 | 1081.3 | 215303 1083.0 104 0 2859 (20)14379 8689 1262812 1298078 81 **STS-87** 102 188297 | 10459 | 16179 | 2188 | 4978 | 227270 0 2998 0 1452 21946 34394 843915 2648665 261664 250693 19147035 1664353 1297733 | 4521900 4384 232930 | 1081.0 | 232849 1082.6 1298120 (24)17496 2998 12448 1281760 6115 STS-89 182187 7059 20679 2450 4972 222513 4596 3508 868 22163 28040 848511 2676705 250583 239584 19386619 1664543 1298227 4511879 2309 217475 | 1086.5 | 217422 1088.2 105 0 16699 5877 1298526 3544 (12) 1299327 **SYS-90** 102 187562 10884 15763 1841 4972 226191 26205 36049 848511 2712754 262270 247955 | 19634574 | 1663992 1298901 4523683 233031 | 1080.3 | 232979 | 1081.9 0 0 0 2340 3162 (25)23865 9844 1325532 1298520 1999 STS-91 103 182624 | 7273 | 21882 | 2450 | 4976 | 224374 2419 0 2964 891 25625 35549 850933 2748303 259973 249580 19884154 1658766 1298618 4514649 631 226968 1079.5 226872 1081.1 22315 9944 1348738 (24)1297292 403 STS-95 103 182647 | 7085 | 25032 | 2294 | 4980 | 227207 125 2973 1314 28520 38618 851055 2786921 265855 247947 20132101 1658996 1297332 4520191 1587 228455 1076.8 228388 1079.5 0 (25)24108 2945 10098 1374160 1298008 2740 STS-88 182065 6997 24612 2451 4971 226265 335 1122 37731 2824652 264026 251336 20383437 1658691 1297827 4518489 2365 201538 1084.3 201492 1086.2 105 26791 0 30986 877846 3073 1378355 1297945 (13) 6745 1043 STS-96 103 183197 | 7174 | 25007 | 2450 | 4977 | 227974 4228 0 213 1034 22707 33808 882074 | 2858460 | 261812 | 245256 | 20628693 | 1658803 1297048 | 4514231 4435 222366 | 1080.2 | 222299 1081.8 17994 (26)11101 1397383 1296568 4306

^{*} NOTE: STS-91 WAS FIRST FLIGHT OF SLWT, 59212 LBS. STS-95 WAS SECOND FLIGHT OF SLWT, 59942 LBS. STS-88 WAS THIRD FLIGHT OF SLWT, 59137 LBS. STS-89 ET WEIGHED 66353 LBS.

(SOURCES: SODB, VOL II Thru STS-57 & DOL TDDP for STS-51 and Beyond)

PERF **ORBITER ORBITER ORBITER** CARGO ORBITER TOTALS NON-FLIGHT PAYLOAD WEIGHTS **FLIGHT** ACCUMULATED ET SRB SHUTTLE MARG AT ΑT RCS PROP W/O **PROP** OMS ORB WT WT ACCUM **TOTAL** TOTAL TOTAL FINAL MACH 3 EON LANDING RETR MID-CARGO FLIGHT **TOTAL** PRI CHARGE PYLD CARGO WT@ LEFT **TDDP** CONS DPLY @ @ @ @ CONS. **PROP** @ DPI Y/ DPLY/ SRB **ORBIT** ORBIT SRB & SRB & @ AND SRB NON-PYLD/ **TOTAL** X CG **SRB** FWD AFT RETR ONLY DECK NON-**TOTAL INSERT** INSERT IGN **RIGHT** IGN **RECON** WT X CG WT DPLY STS DPLY STS-93 102 185743 4820 14814 | 2473 | 4976 | 217975 43080 0 1538 49789 52382 925154 2910842 270387 258911 | 20887604 1658826 1297760 4524972 2081 202872 1097.5 202796 1099.4 0 1404092 1297999 (26) 5171 2593 -3981STS-103 103 183199 7065 24990 | 2451 | 4979 | 227853 5351 1334 20276 2931118 248159 236285 21123889 1658784 1299709 4506419 13576 212288 1080.6 212217 1082.4 5423 0 13208 930577 (27)6451 7068 1411877 1299767 13388 35410 1664331 STS-99 182260 6989 19605 | 2308 | 4968 | 221299 260 1822 930837 2966528 256739 242322 21366211 1299767 4520450 225092 1078.5 225030 105 0 29069 1085 1080.2 1299817 (14)26987 6341 1440686 395 23891 | 2453 | 4980 | 226894 STS-101 104 183166 7235 3371 0 1391 1262 24733 35604 934208 3002132 262528 252056 21618267 1658873 1299223 4519455 1480 226277 | 1081.2 | 226212 1082.9 1298831 (21)20159 10871 1462107 988 STS-106 104 183426 7235 23786 2449 4978 227032 5399 0 948 1172 23967 34991 939607 3037123 262053 253389 21871656 1658741 1299561 4519178 1940 222835 1080.1 222774 1081.7 (22)17935 11024 1481214 1298823 317 STS-92 1333 35250 1658781 1299531 4520549 103 183363 | 7235 | 24629 | 2447 | 4968 | 227808 21998 0 293 28009 961605 3072373 | 263088 253459 | 22125115 1532 205188 | 1080.0 | 205129 | 1081.8 (28)4678 1487225 1299149 2330 7241 STS-97* 181992 6989 | 22156 | 2452 | 4971 | 223736 42804 3115177 266570 253646 | 22378761 1658695 1299246 4524795 197829 1085.9 197781 105 36376 0 227 1021 37496 997981 1920 1087.7 1488965 1300085 2032 (15)719 5308 **STS-98** 104 182605 | 7055 | 22904 | 2227 | 4978 | 224935 32270 0 987 33286 39162 1030251 3154339 264127 251033 | 22629794 1658647 1298270 4519380 2138 197909 1083.1 197854 1082.0 872 1298137 (23)583 5876 1490535 1538 STS-102 103 182881 7055 24940 2452 4975 227469 9649 472 28739 37328 1039900 3191667 264797 253436 | 22883230 1658484 1299774 4521809 2847 218094 1083.2 218031 1084.9 0 1086 (29)3517 8559 1494524 1298555 3031 STS-100 182943 7301 24075 2451 4972 226908 0 29472 38330 1046246 3229997 265268 253063 23136293 1658593 1298945 4522246 2670 220623 1083.8 220556 105 6346 1608 781 1085.5 (16)4282 8858 1499587 1299241 2296 182862 7301 STS-104 104 25033 | 2452 | 4975 | 227787 19782 0 626 582 26424 35135 1066028 3265132 262952 254358 | 23390651 1658552 1298897 4520159 2884 209142 1083.8 209097 1085.6 (24)6060 8711 1506229 1299559 2990 STS-105 103 182831 7055 23428 | 1886 | 4974 | 225340 9657 0 3802 475 29305 37107 1075685 3298239 262477 253897 | 23644548 1658085 1298852 4518170 705 222682 1081.0 222620 1085.6 (30)4654 7802 1511358 1298417 631 1657831 STS-108 105 182106 7058 25057 2452 4972 226711 6454 0 690 31393 38177 1082139 3336416 264918 252854 23897402 1298263 4519872 2381 220623 | 1083.8 | 220556 1085.5 4156 (17)8635 6784 1520683 1298521 1182 STS-109 102 188444 6969 25066 2451 4975 233071 8256 0 6409 1216 20144 27564 1090395 3363980 260665 250970 | 24148372 | 1658065 1298219 4515646 3309 222447 1082.9 222366 1084.6 (27)10672 7420 1532571 1298358 4170 STS-110 104 184160 7060 25072 2451 4975 228854 30600 0 2607 757 28379 35849 1120995 3399829 264763 253486 | 24401858 1658030 1298947 4520964 1256 201513 1085.3 201463 1087.2 (25)0 7470 1533328 1298885 2670 STS-111 183220 7060 25059 2454 4976 227935 9512 288 29712 36082 1130507 3435911 264047 253522 | 24655380 1657969 1297561 4518077 220234 1083.6 220279 1085.3 105 0 6342 2484 (18)906 1534522 1298161 1870 6370 STS-112 104 183924 | 7060 | 25043 | 2179 | 4869 | 228341 29543 0 1839 381 29502 37441 1160050 3473352 265812 254269 2490949 1658013 | 1298072 | 4521314 2744 202688 1087.1 202621 1088.9 (26)7939 1534904 1299078 3860 STS-113 105 183037 7060 25064 2254 4970 227551 29672 2250 288 30217 38393 | 1189722 | 3511745 | 265974 250282 25159931 1658011 1298806 4521249 1736 200993 | 1087.6 | 200939 1089.5 0 (19)46 8176 1535238 1298119 2486 1335 STS-107 102 189487 | 10160 | 17619 | 2180 | 4976 | 229588 1189722 3547208 265081 250270 25410201 1663352 1298648 4526034 234495 234167 1077.9 0 0 0 801 24316 35463 1078.5 (28)23515 11147 1559554 1298614 1348

^{*} Beginning with STS-97 the TDDP included an item for "RECONSTRUCTED ASCENT PERFORMANCE COLLECTOR" in the "Shuttle Total Weight at SRB Igniton".

^{**} WT & CG ARE AT EI AND EI+15 MINUTES.

(SOURCES: SODB, VOL II Thru STS-57 & DOL TDDP for STS-51 and Beyond)

| | ORBITER | | | | | | CARGO | | | | | | ORBITER TOTALS | | | | | | PERF ORBITER | | TER | ORBITER | | | | |
|---------|-------------|---------|-------|--------|-------|-------|--------|----------------|--------|-----------|---------|----------------|----------------|--------------------|----------|--------|--------|-----------------|--------------|--------------------|---------|--------------|--------|--------|--------|--------|
| | | | NON- | | | | | | FLIGHT | PAYLOAD \ | WEIGHTS | i | FLIGHT | ACCUM | ULATED | | | | ET | SRB | SHUTTLE | MARG | ΑT | Γ | ΑT | r |
| | TAIL | W/O | PROP | OMS | RCS I | PROP | ORB | | | | | | | | | WT | WT | ACCUM | TOTAL | TOTAL | TOTAL | FINAL | MACH 3 | 3 EOM | LAND | ING |
| FLIGHT | NO. | | CONS | | | | TOTAL | PRI | DPLY | RETR | MID- | CHARGE- | CARGO | PYLD | CARGO | @ | @ | WT @ | @ | LEFT | @ | TDDP | | | | |
| | OV- | CONS. | @ | PROP | | | @ | DPLY/ | AND | | | ABLE | | DPLY/ | | SRB | ORBIT | ORBIT | SRB | & | SRB | & | | | | |
| | | | SRB | | FWD | AFT | SRB | NON- | RETR | ONLY | DECK | PYLD/ | TOTAL | NON- | TOTAL | IGN | INSERT | INSERT | IGN | RIGHT | IGN | RECON | WT | X CG | WT | X CG |
| | | | IGN | | | | IGN | DPLY | | | | STS | | DPLY | | | | | | | | | | | | |
| STS-114 | 103 | 184906 | 7076 | 24931 | 2174 | 4972 | 229219 | 26413 | 0 | 6600 | 163 | 29807 | 38652 | 1216135 | 3585860 | 267901 | 253950 | 25664151 | 1657242 | 1298074 | 4523083 | 2111 | 225792 | 1086.6 | 225727 | 1088.2 |
| OTO 404 | (31) | 404000 | 7070 | 0.4000 | 0474 | 4000 | 000005 | 3231 | 0 | 0.450 | 450 | 8845 | 07700 | 1562948 | 0000500 | 007004 | 050007 | 05047440 | 4057055 | 1298565 | 4500000 | 3792 | 000000 | 4004.0 | 005070 | 4000.0 |
| STS-121 | 103 (32) | 184902 | 7076 | 24922 | 21/4 | 4968 | 229235 | 23696 5426 | 0 | 8456 | 158 | 29280 8456 | 37736 | 1239831 1568532 | 3623596 | 267001 | 253267 | 25917418 | 1657055 | 1299220 1299312 | 4523889 | 2290 N/A | 226063 | 1084.6 | 225972 | 1086.3 |
| | (32) | | | | | | | 3420 | | | | 0430 | | 1300332 | | | | | | 1233312 | | (Sensor | | | | |
| | | | | | | | | | | | | | | | | | | | | | | ` Fail) | | | | |
| STS-115 | - | 184260 | 6986 | 24926 | 2449 | 4970 | 228734 | 35552 | 0 | 993 | 206 | 35758 | 41848 | 1275383 | 3665444 | 270612 | 252240 | 26169658 | 1657088 | 1298957 | 4526580 | 1749 | 199711 | 1086.0 | 199642 | 1087.0 |
| STS-116 | (27) 103 | 185153 | 7189 | 24959 | 2124 | 4077 | 229555 | 0 5748 | 0 | 806 | 182 | 6090 22502 | 35690 | 1568738 | 3701134 | 265275 | 250980 | 26420638 | 1657123 | 1298678 1298200 | 4520334 | 349 3768 | 224053 | 1077.5 | 223986 | 1079.2 |
| 313-110 | (33) | 100100 | 7 109 | 24959 | 2134 | 4311 | 229000 | 1652 | U | 800 | 102 | 13188 | 33090 | 1585492 | 3/01134 | 203273 | 250960 | 20420030 | 1037 123 | 1298501 | 4520554 | 4559 | 224000 | 1077.5 | 223900 | 1079.2 |
| STS-117 | 104 | 184487 | 7018 | 24298 | 1926 | 4974 | 227846 | 36393 | 0 | 857 | 200 | 36593 | 42641 | 1317524 | 3743775 | 270517 | 255388 | 26676026 | 1657157 | 1298138 | 4525519 | 1306 | 199418 | 1084.6 | 199305 | 1086.8 |
| | (28) | | | | | | | 0 | | | | 6048 | | 1585692 | | | | | | 1298472 | | 1431 | | | | |
| STS-118 | 105 | 185133 | 7189 | 24899 | 2030 | 4975 | 229369 | 11830 | 0 | 316 | 329 | 23899 | 37390 | 1329354 | 3781165 | 266789 | 250805 | 2692831 | 1657180 | 1298333 | 4521318 | 1913 | 221740 | 1078.1 | 221660 | 1079.8 |
| CTC 400 | (20) | 405405 | 7400 | 00700 | 4005 | 4074 | 22777 | 11740 | 0 | 4577 | F0 | 13491 | 40070 | 1597761 | 202227 | 000477 | 054700 | 0044004 | 4057040 | 1297781 | 4504407 | 2435 | 202000 | 4070.0 | 202000 | 4000.0 |
| STS-120 | 103 (34) | 185405 | 7108 | 22763 | 1000 | 4971 | 227275 | 33474 280 | U | 1577 | 59 | 33813 7059 | 40872 | 1362828 1598100 | 3822037 | 268177 | 251790 | 2944621 | 1657012 | 1298906 1298777 | 4524107 | 2091 1880 | 203069 | 1076.3 | 202989 | 1083.0 |
| STS-122 | 104 | 184885 | 7042 | 20823 | 1914 | 4979 | 226743 | 30657 | 0 | 2162 | 122 | 32941 | 40296 | 1393485 | 3862333 | 267069 | 252667 | 3197288 | 1657253 | 1298675 | 4523236 | 2402 | 207013 | 1078.2 | 207215 | 1080.4 |
| | (29) | | | | | | | 2162 | Ţ | | | 7355 | | 1600384 | 000_00 | | | 0.0.0 | | 1299004 | 102020 | 3435 | | | | |
| STS-123 | 105 | 185393 | 7108 | 22763 | 1928 | 4981 | 227316 | 29442 | 0 | 4891 | 188 | 30762 | 38915 | 1422927 | 3901248 | 266261 | 253348 | 3450636 | 1657249 | 1298163 | 4521388 | 2109 | 208916 | 1079.7 | 208762 | 1081.8 |
| 070.404 | (21) | 105 170 | 0000 | 00774 | 4000 | 4074 | 007450 | 1132 | • | 1000 | 70 | 8153 | 44007 | 1601704 | 0040045 | 202472 | 054045 | 0704000 | 405050 | 1298480 | 4505440 | 5128 | 22225 | 10000 | | 1000.0 |
| STS-124 | 103 (35) | 185476 | 6868 | 22771 | 1923 | 4971 | 227152 | 33890 0 | 0 | 1608 | 79 | 33969 8028 | 41997 | 1456817 1601783 | 3943245 | 269179 | 251247 | 3701883 | 1656958 | 1299147 1298621 | 4525140 | 1308 2513 | 203605 | 1088.0 | 203755 | 1089.3 |
| STS-126 | 105 | 185343 | 7108 | 22761 | 2187 | 4971 | 227513 | Ū | 0 | 19436 | 211 | 32403 | 39471 | 1487249 | 3982716 | 267014 | 254431 | 3956314 | 1657112 | 1298611 | 4523242 | 1682 | 221787 | 1087 2 | 221712 | 1089.0 |
| 0.0.20 | (22) | 100010 | 7.00 | 22701 | 2.07 | .07 1 | 227010 | 1760 | | 10100 | | 7068 | 00 11 1 | 1603754 | 00027.10 | 20.0 | 201101 | 0000011 | 1007112 | 1299270 | 1020212 | 2329 | 221101 | 1001.2 | | |
| STS-119 | 103 | 185710 | 6808 | 22762 | 2162 | 4973 | 227558 | 32489 | 0 | 1279 | 57 | 32546 | 39088 | 1519738 | 4021804 | 266676 | 254546 | 4210860 | 1656990 | 1298197 | 4521897 | 1746 | 201795 | 1082.8 | 201713 | 1084.7 |
| | (36) | | | | | | | 0 | | | | 6542 | | 1603811 | | | | | | 1298799 | | 2016 | | | | |
| STS-125 | 104 | 186902 | 7087 | 24984 | 2450 | 4982 | 231548 | 4694 | 0 | 3893 | 0 | 22254 | 32418 | 1524432 | 4054222 | 231548 | 254376 | 4465236 | 1657233 | 1297936 | 4519550 | 1689 | 225509 | 1078.3 | 225469 | 1080.1 |
| STS-127 | (30) 105 | 105510 | 7100 | 22762 | 2204 | 4072 | 227700 | 17560 24266 | 0 | 9756 | 126 | 10164 24682 | 36253 | 1621371 1548698 | 4000475 | 263983 | 252650 | 4717894 | 1657094 | 1298774 1298273 | 4518787 | 2499 2553 | 215900 | 1000.0 | 215817 | 1001.7 |
| 313-121 | (23) | 185510 | 7106 | 22/02 | 2204 | 4973 | 227700 | 24266 | 0 | 9756 | 120 | 11571 | 30233 | 1621787 | 4090475 | 203903 | 252658 | 4/1/094 | 1657094 | 1298273 | 4010/0/ | 2553 | 215900 | 1069.6 | 213617 | 1091.7 |
| STS-128 | 103 | 185683 | 6586 | 22762 | 1934 | 4970 | 227078 | 30572 | 0 | 19130 | 153 | 33056 | 40605 | 1579270 | 4131080 | 267713 | 254672 | 4972566 | 1657188 | 1298511 | 4522876 | 1707 | 222200 | 1088.4 | 222148 | 1090.2 |
| | (37) | | | | | | | 2331 | - | | | 7549 | | 1624271 | | | | | | 1298323 | | 2077 | | | | |
| STS-129 | 104 | 185268 | 7042 | 22762 | 2205 | 4967 | 227387 | 27615 | 0 | 1176 | 353 | 29372 | 38893 | 1606885 | 4169973 | 266310 | 254734 | 5227300 | 1657082 | 1298893 | 4522269 | 2228 | 206917 | 1083.8 | 207200 | 1084.6 |
| 070 400 | (31) | 105100 | 2007 | 20720 | 1010 | 4074 | 00000 | 1404 | | 1000 | 000 | 9521 | 40050 | 1626028 | 4040000 | 007000 | 050000 | = 400400 | 405505 | 1298843 | 4500400 | 2041 | 004400 | 40000 | 001001 | 10010 |
| STS-130 | 105 (24) | 185488 | 6397 | 22763 | 1918 | 49/4 | 226683 | 34648 0 | 0 | 1262 | 283 | 34931 6025 | 40956 | 1641533 1626311 | 4210929 | 267669 | 252838 | 5480138 | 1657227 | 1298385 1297738 | 4522160 | 1188 2828 | 201138 | 1082.8 | 201084 | 1084.8 |
| STS-131 | 103 | 186007 | 6392 | 22762 | 1931 | 4976 | 227212 | 30512 | 0 | 21764 | 231 | 32131 | 39516 | 1672045 | 4250445 | 266758 | 251459 | 5731597 | 1657053 | 1297736 | 4521643 | 1133 | 224257 | 1089.0 | 224206 | 1090.7 |
| 010101 | (38) | .00007 | 0002 | 22102 | 1001 | 1070 | | 1388 | | 21704 | 201 | 7385 | 55510 | 1627930 | 1200770 | 200700 | 201700 | 3731007 | 1007000 | 1298461 | 1021070 | 1491 | | 1000.0 | 1200 | |
| | · / | | | | | | | | | | - | | | | | | | | | | | | | | | |

(SOURCES: SODB, VOL II Thru STS-57 & DOL TDDP for STS-51 and Beyond)

PERF ORBITER ORBITER **ORBITER CARGO ORBITER TOTALS** FLIGHT PAYLOAD WEIGHTS FLIGHT ACCUMULATED SRB SHUTTLE MARG ΑT ΑT NON-ET TAIL W/O OMS RCS PROP ORB WT WT **ACCUM TOTAL** TOTAL TOTAL **FINAL** MACH 3 EOM LANDING PROP MID-FLIGHT DPLY RETR CHARGE-CARGO PYLD CARGO @ @ CONS TOTAL PRI WT @ @ LEFT TDDP OV-CONS. PROP DPLY/ AND ABLE DPLY/ SRB **ORBIT** ORBIT SRB & SRB @ & **SRB** FWD AFT SRB NON-RETR ONLY DECK PYLD/ **TOTAL** TOTAL IGN INSERT IGN **RIGHT** RECON WT X CG WT X CG NON-**INSERT** IGN IGN DPLY STS DPLY STS-132 104 185064 7042 22762 2166 4974 227151 263144 5982767 1299411 4519813 26619 0 7564 121 26740 35963 1698664 4286408 251170 1657088 5074 210434 1081.0 210370 1082.9 (32)9223 1628051 1299029 4326 0 STS-133 103 185336 6084 24861 1927 4971 228323 30576 0 1949 408 31802 40108 1729240 4326516 268461 254067 6236834 1657403 1299112 4525061 1431 205075 1082.4 205022 1084.2 818 8306 1629277 1299345 39210 1759961 4365726 268769 256331 STS-134 105 185638 7007 24860 1907 4973 229529 30721 1609 161 31693 6493165 1657445 1298824 4525091 1968 204532 1080.4 204463 1082.3 (25)1630249 1299313 3211 811 7517

1787958 4403260

1632677

266050 254325

6747490 1657525

1298160 4521103

1298628 4521103

1987

N/A*

184276 | 7072 | 24861 | 2171 | 4962 | 228486 | 27997

0

2137

24175 291

30425 37534

7109

STS-135

104

(33)

Page A-9

226333 | 1090.7 | 226270 | 1092.4

^{*}Reconstruction analysis was not available (N/A) for STS-135 due to lack of funding.

APPENDIX B - ACKNOWLEDGEMENTS AND DATA SOURCES

The authors would like to acknowledge the following individuals for their contributions to the preparation of this book. Data Sources are also provided.

ACKNOWLEDGEMENTS - LEGLER INFORMAL BOOK

To: Brewster H. Shaw, while COO of United Space Alliance, for his sponsorship of Legler's informal book.

To: Mary C. Thomas/DA8 for her dedicated services as Book Manager for Revisions and Change Notices to Bob Legler's informal book through flight STS-115.

To: Karen J. Chisholm/DA8 for her dedicated services as editor and typist for Revisions and Change Notices to Bob Legler's informal book through flight STS-115.

To: All those who helped Bob Legler gather data through flight STS-115.

DATA SOURCES - LEGLER INFORMAL BOOK

This document provides "as flown" operational mission data and has been compiled from many sources including the following:

- Flight Logs
- Flight Rules
- Flight Anomaly Logs
- MOD Post-Flight Reports (Ascent, On-Orbit and Descent)
- Post Flight Analysis of MPS propellants
- FDRD Flight Definiton Requirements Document
- FRD Flight Requirements Document
- SODB Shuttle Operational Data Book
- MER (Mission Evaluation Room) Shuttle Flight Data.
- Orbit Distance traveled is taken from the PAO Mission Statistics.

ACKNOWLEDGEMENTS - BENNETT (STS-116 Through STS-135)

To: James M. Heflin/AB111, Associate Center Director Technical, for his leadership role to publish the informal "Legler Book" as an official NASA Technical Memorandum.

To: USA's continued sponsorship to finalize the NASA Technical Memorandum.

To: Michael Curie, NASA HQs PAO Specialist & Commentator for his many responses to requests for information from Floyd Bennett.

To: M. Cathleen (Cat) Buehrer/DA32 (REDE CRITIQUE NSS JV) for her invaluable tutorial assistance and knowledge provided to Floyd Bennett for navigating through Microsoft Word software for preparation of this final book.

To: Edward P. Gonzalez/DM321 and John A. Fields/ DM111 for excellent technical review.

To: Dale H. Ward/IS4 (Tessada) and Sharon Hecht/IS4 (DB Consulting Group, Inc.) for their excellent editorial comments and final document preparation.

DATA SOURCES - FOR BENNETT

And finally, thanks to all the Data Source Contributors who helped Floyd Bennett find his way to the correct mission data for flights STS-116 through STS-135.

See the listing to follow:

This listing provides the data sources and Point(s) of Contact (POC's) used in preparing the portion of the Space Shuttle Mission Summary Book for missions STS-116 through STS-135. My thanks to all these contributors and many others who helped this author find his way to the correct mission data.

Floyd V. Bennett

ITEM DATA SOURCES

COLUMN 1: FLT NUMBER

FLT NO. FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm

SEQ FLT # Calculated from previous missions

KSC-# Calculated from previous missions at KSC

PAD # FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm

PAD # (#) Calculated from previous missions same pad

MLP-3 FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm

SHUTTLE

FLIGHT TO ISS Calculated from previous missions to ISS

COLUMN 2: ORBITER

ORBITER

Vehicle Designation (Number of Flights)

Vehicle Name FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm

OMS PODS

Left POD #, Right POD #, & FWD RCS POD #

MV/Orbiter Project Office, POC's: Dwyer, Kenneth J. (JSC-MV6) and Storm, Michael D. (KSC-USA)

of Flights of each POD # of flights calculated from previous flight of the POD's

<u>ITEM</u> <u>DATA SOURCES</u>

COLUMN 3: CREW SIZE: TITLE, NAMES, AND EVA'S

FLIGHT CREW SIZE FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm

FLIGHT CREW,

FLIGHT DIRECTORS,

& CAPCOMS

TITLES & NAMES DA8/Lead Flight Directors Memos & JSC PAO Mission Press Kit: http://www.shuttlepresskit.com

EVA's

Type and Duration JSC PAO Shuttle Status Reports: http://www.nasa.gov/centers/johnson/news/shuttle/index.html

MMT Briefings: John A. Mccullough, Annette P. Hasbrook, Norm Knight DA8

of EVA's Calculated from previous mission EVAs

COLUMN 4: LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES

LAUNCH SITE

Launch Pad FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm

Launch Date & Time Ascent FDO Post Flight Report/DM, POC's: Gonzalez, Edward P. Sparks, Carson W. (USA), & McDonald, Mark A. (USA)

Day of Week (#) Refers to # of launches that day of week calculated from previous missions same day of week

Date (#) Refers to # of launches that month calculated from previous missions same month

LAUNCH WINDOW Real-time data, POC: Sparks, Carson W. and Mark McDonald (JSC-DM) [USA]

EOM PLS Planned landing site: FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm

TAL Ascent FDO Post Flight Report/DM, POC's: Gonzalez, Edward P. Sparks, Carson W. (USA), McDonald, Mark A. (USA),

& Kalil, Jose G. (JSC-DM)[USA]

TAX WX Spacecraft Meteorology Group Post Mission Summary, POC: Oram, Timothy D. (JSC-WS8) [NOAA]

SELECTED:

RTLS, TAL, AOA, PLS LSO Post-Flight Summary, POC: Linde, Martin G. (JSC-DM) [USA] & Hensley, Doyle W. (JSC-DM461)

MAX Q NAV STS-XXX GNC First Stage Reconstruction: https://sspweb.jsc.nasa.gov/w ebdata/sei/t_Post%20Flight%20Reports/

POC's: Cooper, Carling C. (Boeing), and Biskup, Bruce A., (Boeing)

SRB STG: [MET] STS-XXX Ascent Performance Trajectory Reconstruction letter, POC: Stephen P. Brod/The Boeing Company (HM5-20)

ALL REMAINING DATA

THIS COLUMN

Ascent FDO Post Flight Report/DM, POC's: Gonzalez, Edward P. Sparks, Carson W. (USA), & McDonald, Mark A. (USA)

<u>ITEM</u> <u>DATA SOURCES</u>

COLUMN 5: LANDING SITE/RUNWAY, CROSSRANGE, LANDING TIMES, FLIGHT DURATION, WINDS

ALL ITEMS EXCEPT Descent Postflight Summary & Quicklook Reports: http://usa1.unitedspacealliance.com/usahou/orgs/48-20/dsct/pf/

ENTRIES LISTED BELOW: POC: Barbara Schill (USA) & Chris Re (USA), Chris Lessman (USA), Rosalyn Mark

LANDING EVENTS

Time of Landing Image Science & Analysis group: http://isal-web1.jsc.nasa.gov/Shuttle/ShowPage.pl?template=default.htm

Ascent/Descent Flight Design, POC: Lessmann, Christopher F. (USA)

Site (#) Site (#) refers to # of landings at a site, calculated from previous landing at that site Surface (#) Surface (#) refers to # of landings on surface from previous landings on same surface

Landing Day of Week (#) (#) refers to # of landings on that particular weekday, calculated from landings on same weekday

Landing Date (#) (#) refers to # of landings in a particular calendar month, calculated from landings in the same calendar month

DEORBIT BURN GMT (e.g., 051:12:59:52.0Z)-DM Trajectory Server - Legler Report, POC's:Propst, Carolyn A. (USA) & Deboeck, Toni F

(USA)

ORBIT DIR (#) refers to # of landings from the same direction, calculated from # of last mission at same direction

TIME OF EVENTS

DURING LANDING LLIMS Events: http://isal-web1.jsc.nasa.gov/llims/ObservationPublic.aspx?Mode=screening&mission=STS-XXX

ROLLOUT

Distance (ft)

Calculated: wheels stop position - MLGTD position

Time (sec)

Calculated: wheels stop GMT - MLGTD GMT

WINDS: OFFICIAL

and DENS ALT (ft) Spaceflight Meteorology Post Flight Mission Summary, POC: Oram, Timothy D. (JSC-WS8) [NOAA]

FLT DURATION

S/T Shuttle total flight time, calculated: mission duration + sum of previous missions

OV-XXX: Total flight time for specific orbiter vehicle, calculated: mission duration + sum of previous missions

DISTANCE Statute miles traveled this mission: PAO Missions Stats Report, POC: Herring, Kyle J. (JSC-AP311)

TOTAL SHUTTLE DISTANCE Calculated: distance traveled this mission + sum of previous missions

PAO Missions Stats Report, POC: Herring, Kyle J. (JSC-AP311)

<u>ITEM</u> <u>DATA SOURCES</u>

COLUMN 6: SSME-TL, NOM-ABORT, EMERG THROTTLE PROFILE

SSME THROTTLE LEVELS

PREDICTED FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm

ACTUAL Ascent FDO Post Flight Report/DM, POC's: Gonzalez, Edward P. Sparks, Carson W. (USA), & McDonald, Mark A. (USA)

ENG. S.N. FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm

(#) Refers to # of flights by engine serial number - calculated from previous flight by that SSME

M 3 EOM and LANDING

WEIGHT and X CG IDP Cycle/Prop30 Aerosciences Report/Version 01, POC: Schill, Barbara C. (USA)

COLUMN 7: SRB, RSRM, AND ET

SRB, RSRM, and ET FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm

ET IMPACT: MET, LAT, LONG STS-XXX Nominal ET Disposal Chart and ET Summary Table, POC: Dulski, Matthew B. (USA) & Strach, Daniel P (USA)

COLUMN 8: ORBIT INCLINATION

INC FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm

COLUMN 9: ORBIT HA/HP

INSERTION (type) FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm

POST OMS-2 (nm) and

DEORBIT HA/HP DM Trajectory Server - Legler Report Request, POC's: Propst, Carolyn A. (USA), Deboeck, Toni F (USA), and Leleux, Darrin

P. (JSC-DM411)

ENTRY VELOCITY (fps) and

ENTRY RANGE (nm) Descent Post Flight Summary: http://usa1.unitedspacealliance.com/usahou/orgs/48-20/dsct/pf/, POC: Hill, Trudy D. (Debbie)

(USA)

<u>ITEM</u> <u>DATA SOURCES</u>

COLUMN 10: FLIGHT SOFTWARE (FSW)

OI-XX Orbit Insertion Flight Software version # - FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm

(#) refers to # of flights flown - calculated from last flight of that FSW version

COLUMN 11: PAYLOAD WEIGHTS; PAYLOADS, EXPERIMENTS

PAYLOAD WEIGHTS Day of Launch (DOL) Trajectory Design Data Package (TDDP), POC: Bhula, Jayantilal (Jay) (USA)

TOTAL, MIDDECK, DEPLOYED, and NON-DEPLOYED

SHUTTLEACCUMULATED

WEIGHTS Calculated (summed) from previous missions

DEPLOYED, NON-DEPLOYED, and CARGO TOTAL

PERFORMANCE MARGIN (LBS)

FPR and FUEL BIAS, Day of Launch (DOL) Trajectory Design Data Package (TDDP), POC's: Bhula, Jayantilal (Jay) (USA)

FINAL TDDP Provided by Mike . L. Scott/USA/FDD POC

RECON STS-XXX Ascent Performance Trajectory Reconstruction, POC:Steven P. Brod/Boeing

ASSIGNMENTS FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm

PAYLOADS: PLB and MIDDECK

CRYO TANK SETS

STS OPERATOR SELECTIONS

RMS (#) -# of flights RMS flown - calculated from previous missions with RMS

APPENDIX B - ACKNOWLEDGEMENTS AND DATA SOURCES (Continued)

<u>ITEM</u> <u>DATA SOURCES</u>

COLUMN 12: MISSION HIGHLIGHTS

BRIEF MISSION SUMMARY JSC PAO Mission Press Kit: http://www.shuttlepresskit.com/

MMT Minutes: https://sspweb.jsc.nasa.gov/mmt/

KSC W/D (Work Days) KSC Milestone Interface Chart, POC: Overton, Thomas L. (KSC) [ASRC AEROSPACE] & Clark D. Ford (KSC PHO00)

LAUNCH POSTPONEMENTS SSPO PRCB Directives: https://sspweb.jsc.nasa.gov/meeting/mtgdata.cfm

LAUNCH SCRUBS MMT Minutes: https://sspweb.jsc.nasa.gov/mmt/

LAUNCH WINDOW Real-time Data, POC: Sparks, Carson W. (JSC-DM) [USA]

LAUNCH DELAYS MMT Minutes: https://sspweb.jsc.nasa.gov/mmt/

TAL WEATHER Spaceflight Meteorology Group Post Mission Summary,

http://www.srh.noaa.gov/smg/XXX Postmission Summary.pdf (XXX is STS Flight #)

POC: Oram, Timothy D. (JSC-WS8) [NOAA]

PERFORMANCE

ENHANCEMENTS Day of Launch (DOL) Trajectory Design Data Package (TDDP), POC: Bhula, Jayantilal (Jay) (USA)

FLIGHT DURATION

CHANGES/LANDING MMT Minutes: https://sspweb.jsc.nasa.gov/mmt/

Spaceflight Meteorology Group Post Mission Summary, POC: Oram, Timothy D. (JSC-WS8) [NOAA]

FIRSTS/LASTS JSC PAO Mission Press Kit: http://www.shuttlepresskit.com/

Flight Readiness Reviews: https://sspweb.jsc.nasa.gov/webdata/launch/

NIGHT LAUNCH (#) Number of night launches, calculated from previous night launch mission

NIGHT LANDING (Site, #) Number of night landings at specified site, calculated from previous night landing mission at that site

RENDEZVOUS Number of rendezvous missions, calculated from previous rendezvous mission

Continued...

APPENDIX B - ACKNOWLEDGEMENTS AND DATA SOURCES (Continued)

ITEM DATA SOURCES

COLUMN 12 MISSION HIGHLIGHTS (Continued)

EVENTS

Time of on-orbit maneuver events (OMS 2, IT, etc.)

DM Trajectory Server - Legler Report, POC's: Propst, Carolyn A. (USA) and Deboeck, Toni F (USA)

Time of docking/undocking

events

APDS sensor Data from the ODRC, POC: Dake, Janna J., Murphy, Rachel & Haskovec, Doug (JSC-DS421)

Time of ISS hatch opening

and crew welcome

JSC PAO Shuttle Status Reports: http://www.nasa.gov/centers/johnson/news/shuttle/index.html

EVA descriptions and

durations

Post flight EVA notes (provided by DX POC)

JSC PAO Shuttle Status Reports: http://www.nasa.gov/centers/johnson/news/shuttle/index.html

Transfers (hardware and

consumables weights)

STS-XXX Final Customer Support Room (CSR) Report and STS-XXX Mission by the Numbers (provided by MO POC's)

SIGNIFICANT ANOMALIES

PCASS In-flight Anomalies: https://usa93.usa-spaceops.com:4443/adamvweb/ifa.ifa search2.wp execfind

ENTRY BLACKOUT

INCO Electronic Flight Log (Provided by DS POC Steve Sides & Mark Williamson)

WEIGHT SUMMARY

All entries except entries below:

Day of Launch (DOL) Trajectory Design Data Package (TDDP): POC: Bhula, Jayantilal (Jay)/USA

Orbiter Tail No.

FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm

Shuttle /PL Accumulated WTs

Calculated from previous missions

Weight at Orbit Insertion Performance Margin

Ascent Post Flight Data (provided by Gonzalez, Edward P./JSC-DM)

Final TDDP

Provided by Mike . L. Scott/USA/FDD POC

Reconstructed

STS-XXX Ascent Performance Trajectory Reconstruction (Kristin Smaltz & Stephen Brod/Boeing)

Orbiter weight at Mach 3 EOM

and at Landing

IDP Cycle/Prop30 Aerosciences Report (provided by Barbara Shill & Rosalyn Mark/USA/FDD/SDM)

PHOTOS (All Missions)

Identified by NASA Number, unless otherwise noted. POC: Jody Russell/JSC-AP (Tessada)

APPENDIX C - FLIGHT DIRECTOR LOG

This appendix provides the JSC Flight Director Log initially compiled and kept updated by Bob Legler, "History Flight". Since his death the log has been maintained by the Flight Director Office staff. This is a listing of Flight Directors beginning with Christopher C. Kraft, Jr. "Red Flight" in 1960 with Project Mercury flights, and ending with the completion of the Space Shuttle Program in 2011.

Note: Names listed in blue denote photo available from electronic copy by "control-hold-click".

FLIGHT DIRECTOR LOG
(August 2010)
Compiled by HISTORY FLIGHT and updated by DA8 Staff

| # | COLOR | NAME | CLASS | STATUS | First Shift on Console | Retired as a Flight Director |
|--------|--------------------|----------------------------|--------|--------------------|---------------------------|------------------------------------|
| 1 | Red Flight | Christopher C. Kraft | 1960 | Retired | | 1967 |
| 2 | Blue Flight | John Hodge | 1963 | Retired | | 1,0, |
| 3 | White Flight | Eugene F. Kranz | 1963 | Retired | | 1974 |
| 4* | Black Flight | Glynn S. Lunney | 1963 | Retired | | 1771 |
| 5 | Green Flight | Clifford E. Charlesworth | 1966 | Deceased - 2001 | | 1970 |
| 6 | Gold Flight | Gerald D. Griffin | 1968 | Retired | | 1973 |
| 7 | Maroon Flight | Milton L. Windler | 1968 | Retired | | |
| 8 | Orange Flight | M. P. (Pete) Frank | 1968 | Deceased - 2005 | | 1983 |
| 9 | Purple Flight | Phillip C. Shaffer | 1971 | Deceased - 2007 | | 1974 |
| 10 | Crimson Flight | Donald R. Puddy (STS-1) | 1971 | Deceased - 2007 | | 1981 |
| 11 | Silver Flight | Neil B. Hutchinson (STS-1) | 1971 | Retired | | 1984 |
| 12 | Bronze Flight | Charles R. Lewis (STS-1) | 1971 | Retired | | 1984 |
| 13 | Ivory Flight | Tommy W. Holloway | 1979 | Retired | | 1984 |
| 14 | Crystal Flight | Harold M. Draughon | 1979 | Retired | | 1984 |
| 15 | Gray Flight | Gary E. Coen | May-81 | Retired | | 1995 |
| 16 | Granite Flight | John T. Cox | May-81 | Retired | | 1988 |
| 17 | Emerald Flight | Jay H. Greene | May-81 | Retired | | 1987 |
| 18 | Amber Flight | Brock (Randy) Stone | Nov-81 | Retired | | 1993 |
| 19 | Indigo Flight | Lawrence S. Bourgeois | Nov-81 | Retired | | 1991 |
| 20 | Aquila Flight | A. (Lee) Briscoe | Mar-83 | Retired | | 1991 |
| 21 | Orion Flight | T. Cleon Lacefield | Mar-83 | Retired | | 1986 |
| 22 | Polaris Flight | Granvil A. Pennington | Mar-83 | Retired | | 2007 |
| 23 | Alpha Flight | William D. Reeves | Mar-83 | Retired | | 2001 |
| 24 | Altair Flight | Charles W. Shaw | Mar-83 | Retired | | 2003 |
| 25 | Sirius Flight | J. Milton Heflin, Jr. | Mar-83 | Retired | | 2005 |
| 26 | Rigel Flight | Charles R. Knarr | Mar-83 | Retired | | 1991 |
| 27 | Phoenix Flight | Ronald D. Dittemore | Nov-85 | Retired | | 1992 |
| 28 | Turquoise Flight | N. Wayne Hale, Jr. | Feb-88 | Retired | | 2004 |
| 29 | Antares Flight | Robert E. Castle, Jr. | Feb-88 | Retired | | 2003 |
| 30 | Falcon Flight | Robert M. Kelso | Feb-88 | Retired | | 2000 |
| 31 | Regulus Flight | Philip L. Engelauf | Dec-89 | Retired | | 2008 |
| 32 | Aurora Flight | Jeffrey W. Bantle | Dec-89 | Retired | | 2001 |
| 33 | Corona Flight | Linda J. (Hautzinger) Ham | Jan-91 | Retired | | 2000 |
| 34 | Burgundy Flight | Richard D. Jackson, Jr. | Jan-91 | Retired | | 1997 |
| 35 | Kitty Hawk Flight | John F. Muratore | Jan-92 | Retired | | 1994 |
| 36 | <u>Iron Flight</u> | Paul F. Dye | Nov-93 | | | |
| 37 | Perseus Flight | Bryan P. Austin | Nov-93 | Retired | | 2003 |
| 38 | Midnight Flight | John P. Shannon | Nov-93 | Retired | | 2004 |
| 39 | Argon Flight | Andrew F. Algate | Oct-94 | Retired | | 2008 |
| Contin | | | | | | |

FLIGHT DIRECTOR LOG
(August 2010)

Compiled by HISTORY FLIGHT and updated by DA8 Staff
(Continued)

| (Continued) | | | | | | | | |
|-------------|------------------------|--------------------------|---------|-----------|----------------|--------------|--|--|
| | COLOR | NAME | CLASS | STATUS | First Shift on | Retired as a | | |
| # | | | | | Console | Flight | | |
| | | | | | | Director | | |
| 40 | Atlas Flight | Paul S. Hill | Jun-96 | Retired | | 2005 | | |
| 41 | Ares Flight | Jeffrey M. Hanley | Jun-96 | Retired | | 2005 | | |
| 42 | Cardinal Flight | Mark A. Kirasich | Jun-96 | Retired | | 2006 | | |
| 43 | Cassini Flight | <u>Sally P. Davis</u> | Jun-96 | Retired | | 2008 | | |
| 44 | Azure Flight | Mark J. Ferring | Jun-96 | Retired | | 2007 | | |
| 45 | <u>Arcturus Flight</u> | John M. Curry | Jun-98 | Retired | | 2007 | | |
| 46 | Pegasus Flight | Richard E. La Brode, Jr. | Jun-98 | | | | | |
| 47 | Chromium Flight | Leroy E. Cain | Jun-98 | Retired | | 2005 | | |
| 48 | Sapphire Flight | Kelly B. Beck | Jun-98 | Retired | | 2008 | | |
| 49 | Flash Flight | Joel R. Montalbano | Oct-00 | Retired | | 2008 | | |
| 50 | Eagle Flight | John A. McCullough | Oct-00 | | | | | |
| 51 | Amethyst Flight | Norman D. Knight | Oct-00 | | | | | |
| 52 | Fuchsia Flight | Annette P. Hasbrook | Oct-00 | Retired | | 2009 | | |
| 53 | Titanium Flight | J. Derek Hassmann | Oct-00 | | | | | |
| 54* | Onyx Flight | Bryan C. Lunney | Oct-00 | [Retired] | | [2011] | | |
| 55 | Aquarius Flight | Matthew R. Abbott | Oct-00 | | | | | |
| 56 | Topaz Flight | Catherine A. Koerner | Oct-00 | Retired | | 2007 | | |
| 57 | Intrepid Flight | Anthony J. Ceccacci | Oct-00 | | | | | |
| 58 | Garnet Flight | Steven J. Stich | Oct-00 | Retired | | 2007 | | |
| 59 | Defiant Flight | Kwatsi Alibaruho | Feb-05 | | | | | |
| 60 | Vega Flight | Ginger Kerrick | Feb-05 | | | | | |
| 61 | Galileo Flight | Robert Dempsey | Feb-05 | | | | | |
| 62 | Viking Flight | Holly Ridings | Feb-05 | | | | | |
| 63 | Mercury Flight | Dana Weigel | Feb-05 | | 01/16/06 | | | |
| 64 | Liberty Flight | Brian Smith | Feb-05 | | 02/13/06 | | | |
| 65 | Sigma Flight | Richard Jones | Feb-05 | | 06/30/06 | | | |
| 66 | Kodiak Flight | Michael Sarafin | Feb-05 | | 07/13/06 | | | |
| 67 | Apex Flight | Michael Moses | Feb-05 | Retired | 09/05/06 | 2008 | | |
| 68 | Sequoia Flight | Heather Rarick | June-06 | | 02/26/07 | | | |
| 69 | Gemini Flight | Ron Spencer | June-06 | | 04/23/07 | | | |
| 70 | Peridot Flight | Emily J. Nelson | 2007 | | 12/03/07 | | | |
| 71 | Tranquility | Courtenay McMillan | 2007 | | 12/07/07 | | | |
| 72 | Odyssey Flight | David Korth | 2007 | | 3/31/08 | | | |
| 73 | Venture Flight | J. Chris Edelen | 2007 | | 4/11/08 | | | |
| 74 | Tungsten Flight | Royce J. Renfrew | 2008 | | 10/31/08 | | | |
| 75 | Raptor Flight | Jerry P. Jason | 2008 | | 4/14/09 | | | |
| 76 | Viper Flight | Gary C. Horlacher | 2008 | | 7/16/09 | | | |
| 77 | Saturn Flight | Michael L. Lammers | 2008 | | 7/11/09 | | | |
| 78 | Carbon Flight | Edward A. Van Cise | 2009 | | 1/20/10 | | | |
| 79 | Keystone Flight | Scott Stover | 2009 | | 3/29/10 | | | |
| 80 | Steel Flight | Dina Contella | 2009 | | 5/10/10 | | | |
| | | | | | | | | |

* Second generation FDs, #4 Glynn Lunney and #54 Bryan Lunney

NOTE: There were two additional individuals that were selected as flight directors but elected to not continue: Rick Fitts and Michele Brekke. Continued...

| HONORARY FLIGHT DIRECTORS | | | | | | |
|---------------------------|----------------|------------------------|-----------------|--|--|--|
| | COLOR | NAME | STATUS | | | |
| 1 | Grey Flight | Howard W. Tindall, Jr. | Deceased - 1995 | | | |
| 2 | Pink Flight | Lois Ransdell | Deceased - 1996 | | | |
| 3 | Diamond Flight | Alene Ganzer | | | | |
| 4 | Scarlet Flight | John W. O'Neill | | | | |
| 5 | History Flight | Robert D. Legler | Deceased - 2007 | | | |

THE FLIGHT DIRECTOR OFFICE: "Provides leadership and direction for conducting human space flight operation. Our mission is to ensure excellence in mission operations for Human Space Flight." (DA8 Home Page)

IN MEMORIAM



Bob Legler
April 4, 1927 - March 16, 2007

Bob Legler, the originator of the informal Space Shuttle Missions Summary Book, was born a natural Corn Husker and lived a full life. His true love was serving his country in the US Coast Guard, Merchant Marines, United Nations, US Army, and the NASA Space Programs as an aerospace engineer. As one of a handful of people to ever support the Mercury, Gemini, Apollo, Skylab, Space Shuttle, and International Space Station missions, Bob was an icon to his peers. He spent 44 years in this noble endeavor called manned space flight. In the memorial service for Bob, Milt Heflin, JSC Associate Director and former JSC Chief Flight Director, provided the following insight:

"Bob was about making things happen, no matter what his position or rank, in whatever the enterprise was at that time...it might have been dodging bullets and bombs while establishing communication systems for United Nations outposts in crazy places...it might have been while riding the Coastal Sentry Quebec Tracking ship in the Indian Ocean...watching over the Lunar Module electrical power system or the operation of the Apollo Telescope Mount...serving as a SPAN Manager in the MCC (where a lot of really good stories were told during crew sleep)...or even while serving as the Chairman of the Annual FOD Chili Cook-off or his beloved Chairmanship of the Apollo Flight Operations Association [for reunions]... in each case he gave of himself so that the "mission," no matter what it was, could be successful...Bob might not have been the most efficient chairman...story telling could get in the way from time to time...but he made up for it by being a catalyst, causing the team to rise to the occasion...

(Continued)

IN MEMORIAM

(Continued)

And, we all know quite well his love of capturing the history of manned space flight...Apollo reunions and producing the Space Shuttle Missions Summary Book are two of his legacies...events and things with Bob's hands that were done for the enjoyment of all...he took great pride in keeping the "official" Flight Director Log, a listing of those that have served as a Flight Director in Mission Control...the Log today lists 69 Flight Directors beginning with Red Flight, Chris Kraft...even I had a hard time in convincing Bob that I would not abuse my electronic copy of this list, if he would just send it to me...this list also contains the names of only five individuals designated as an Honorary Flight Director...Bob is number 5, known as 'History Flight,' given that honor upon his retirement..."

From Randy Stone, former JSC Chief Flight Director and former JSC Deputy Director: "Bob mentored all of the new Flight Controller's with his wisdom, knowledge, but more importantly his passion for human space flight."

Others commented: "Bob was a walking encyclopedia of space knowledge and also had a great sense of humor." "Bob was a rarity in the annuals of human space flight — a joyful cheerleader [with] unabashed love of the space program." "I could always rely on Bob for hard to find info. His enthusiasm for his work was obvious." "Bob was good natured and enjoyed a good joke, even if it was on him. I love Bob and will miss him."

And, shortly before Bob died, he received the following note from Bob Cabana, KSC Center Director and former Astronaut: "Bob, I look forward to your Summary Shuttle Book after the last [final] Shuttle mission. I think it's the only way I'm ever going to remember what missions I CAPCOM'ed on and who was on console with me."

The detail, the accuracy, the completeness of this Space Shuttle Missions Summary Book are a testament to Bob Legler's "passion and knowledge" for human space flight. We will finish this book for him with the same dedication.

> Floyd Bennett Friend & Colleague

ABOUT THE SECOND AUTHOR - FLOYD V. BENNETT



After Bob Legler's death in 2007, Floyd Bennett asked for and was given the task of completing Bob Legler's Space Shuttle Missions Summary Book, beginning with flight STS-116 and ending with the final Space Shuttle Mission. He was a friend and colleague of Bob's during the Apollo and Space Shuttle Programs. He also worked with Bob as a member of the Apollo Flight Operations Association for reunion events and was a co-author of Bob's 35th [and last] Apollo Anniversary Reunion Book.

Floyd has 57 years of technical and managerial experience in the field of Aerospace Engineering. After graduation from Virginia Tech University in 1954, he joined the National Advisory Committee for Aeronautics (which became NASA in 1958) at Langley Research Center in Hampton, VA. As a research engineer he published several NACA/NASA Technical Reports on aircraft aeroelasticity. In 1962 he transferred with the Space Task Group to the Manned Spacecraft Center (now Johnson Space Center) in Houston, TX. Here he performed and managed analyses for manned spaceflight in engineering development, mission planning, flight operations, systems integration, and finally as a Space Shuttle Missions historian.

He performed key roles during the Apollo Program in establishing the Lunar Module Spacecraft landing and ascent operational trajectory strategies, lunar landing site selection, mission planning and real-time mission support for all Apollo manned lunar landing missions. During the Space Shuttle Program he performed a key role in systems integration for establishing program control of vehicle weight and performance for initial Space Shuttle manned development flights.

After NASA retirement in 1982 he continued making contributions in Space Shuttle Systems Integration for resolution of Payload, SSME, and Orbiter technical issues while working for three different NASA contractors, retiring from United Space Alliance in 2006.

Floyd is an Associate Fellow & Emeritus Lifetime Member American Institute of Aeronautics & Astronautics. He has received numerous NASA and USA awards for exceptional service during the Apollo and Space Shuttle Programs including an Apollo 15 Astronaut's Lunar Landmark named "Bennett Hill".

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